

Professional Activities of Experienced Occupational Health Nurses

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ABSTRACT

Occupational health nurses have diverse backgrounds and their practices require the ability to perform unique professional tasks. This study empirically evaluated their activities and skills using a web-based log system to describe activities at 15 specific sampled times. A national sample of 128 occupational health nurses provided 1,893 activity logs revealing occupational health nurses use both clinical and management skills on a regular basis; indirect client care is as common as direct “hands-on” client care. Most occupational health nurses are directly paid by their employer and activities serve to benefit both individual workers and their employers. Occupational health nurses have specific knowledge and skills in addition to general nursing competencies. Understanding the actual work of occupational health nurses is necessary to align training, certification, and competency maintenance systems such as continuing education with the unique skills used in actual practice activities. [*Workplace Health Saf* 2014;62(6):233-242.]

Occupational health nursing has evolved considerably over the past decade and occupational health nurses play increasingly diverse roles in service delivery (McAdams, Kerwin, Olivo, & Goksel, 2011; Thompson & Wachs, 2012). In addition, the nature of North American workplaces, worker populations, and the organization of occupational health services has also changed (National Research Council, Committee for the Review of NIOSH Research Programs & Institute of Medicine, 2009). Occupational health nurses’ professional backgrounds, education, and experiences are par-

ticularly diverse (Mackey, Cole, & Parnell, 2003; Rogers, Randolph, & Ostendorf, 2011; Thompson & Wachs, 2012); therefore, an understanding of their work is essential for planning professional workforce development, optimizing educational programs, guiding professional certification programs, and most effectively integrating nursing professional activities with other occupational health disciplines.

Several methods could be used to assess the skills and activities of health care professionals, including occupational health nurses. Some researchers have used national surveys to enumerate the number and location of practitioners (Thompson & Wachs, 2012). Others have relied on descriptions of members belonging to appropriate professional organizations (Burgel & Kennerly, 2012) such as the American Association of Occupational Health Nurses or those who have achieved certification as certified occupational health nurse (COHN) or certified occupational health nurse-specialist (COHN-S). Professional leaders, either as individuals or via committees of national organizations (American Association of Occupational Health Nurses, 2013), may provide descriptions of occupational health nurses’ skills, competencies, and activities. Other studies have relied on collecting the opinions of practicing health

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Submitted: November 11, 2013; Accepted: April 14, 2014; Posted online: June 6, 2014

The authors have disclosed no potential conflicts, financial or otherwise.

The authors gratefully acknowledge the efforts of the participating occupational health nurses and thank Ann M. Lachat, CEO of the American Board for Occupational Health Nurses, Inc., Kay Campbell, EdD, Executive Director of the American Association of Occupational Health Nurses, Sarah Barrett, and Samantha Wu, MS, for their assistance.

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doi:10.3928/21650799-20140514-03

Applying Research to Practice

This research has several practical implications for occupational health nurses. Occupational health nurses should have specific skills beyond those used by nurses in other areas. The practice settings of many occupational health nurses differ from other areas of nursing. Occupational health nurses must function effectively in corporate and medical center employee health contexts. Clinical competency is needed in most occupational health nursing practices, even for nurses providing only indirect care to workers. Occupational health nursing work is diverse. An activity log approach similar to that used in this study may assist individual nurses in assessing the specific activities and skills needed in their work settings.

professionals or faculty members of educational programs about nurses' activities and needs (Snyder, Ruth, Sattler, & Strasser, 1994). More structured approaches are sometimes used by governmental or voluntary licensing or certification organizations in prescribing specific criteria for recognition.

The current study complements these approaches by using a "work sampling" technique; participating occupational health nurses provided a series of "snapshots" of activities at specific times. This method is less likely to result in estimating errors or recall bias (Harber et al., 2010a).

METHODS

This work was part of the Occupational Health Practice research project, sponsored by the National Institute for Occupational Safety and Health. The project was reviewed and approved by the University of Arizona Institutional Review Board. The overall methods have been described in several earlier articles (Harber et al., 2010a, 2010b, 2012, 2013).

Participants were recruited from three occupational health professions: occupational medicine, occupational health nursing, and industrial hygiene. Nurses were eligible to participate if they self-identified as occupational health nurses and spent at least 50% of their work time practicing occupational health nursing. Information was collected using an online secure system (Survey Monkey, Palo Alto, CA).

Participants were recruited from professional organization meetings, e-mails distributed by professional organizations, and web postings. They completed an online informed consent and had the opportunity to ask questions about the research. Those who chose to participate in the study received a small fee.

Data were derived from two sources. First, a baseline questionnaire was used to collect data about educational background, practice location, certification status, and personal demographic characteristics.

Then, each participant completed 15 online activity logs, providing five logs per day for 3 days. Each log described activities at a specific point in time and therefore did not require recall for estimation of overall activities. The major domains are summarized in the tables in the Results section of this report. To avoid bias, the times were selected by the investigative staff with several constraints. The 3 days chosen were non-contiguous, but accomplished within a 2-week period. Possible times were limited to the hours during which participants were actually working.

Participating nurses received reminders by e-mail prior to each study day. Responses were monitored and reminders were sent to those who did not complete the logs and required rescheduling. Participants who did not have computer access at sampled times could record their activity information on a short paper form and then enter it online at a later, more convenient time. To enhance confidentiality, participants were assigned a four-letter word code to be used rather than their names when completing online activity reports.

The data collection instruments included forced choice questions or entry of specific numbers. In addition, several questions required brief free text entries. Several key questions allowed selection of "other" and free text write-in fields to be used if respondents felt none of the choices adequately represented their activities. The responses were reviewed by a research staff member and re-coded to one of the designated choices. If this could not be done in an unambiguous manner, the data were treated as missing to avoid potential misclassification. Several questions in distinct parts of the log forms were interrelated, allowing monitoring of validity. For example, answers about direct beneficiary may be cross checked with responses to corresponding questions about payment source or goal.

The activity log system used extensive branching. This strategy encouraged respondents to provide in-depth information without overwhelming them with too many questions (e.g., if an activity did not include direct clinical client contacts, questions about clinical tools used at the moment were not presented.)

Data were downloaded from the Survey Monkey server, imported into Microsoft Excel (Microsoft Corporation, Redmond, WA), and imported to Microsoft Access. Necessary queries were written and complemented by Visual Basic for Applications code as necessary to facilitate data management. For example, several questions allowed respondents to provide multiple answers (e.g., tools used) and composite variables were created by combining appropriate fields. The researchers used SAS for PC version 9.3 (SAS Institute, Cary, NC) for statistical analyses and descriptive statistics for categorical and continuous variables. Hypothesis testing employed *t* tests or chi-square tests as appropriate.

The methods were reviewed by an advisory committee including practicing occupational health nurses and nurse leaders. In addition, representatives of collaborating organizations such as the American Association of Occupational Health Nurses shared their insights on the

methodology and interpretation. However, this report represents the conclusions and opinions of those specifically identified as authors.

RESULTS

Occupational health nurses were recruited primarily from the American Association of Occupational Health Nurses annual meeting and from e-mail announcements distributed by the American Board of Occupational Health Nursing. Other occupational health nurses were recruited by web postings and similar techniques.

As shown in **Table 1**, participants were nearly all women. They had varied levels of formal education; approximately 65% had earned bachelor degrees, diplomas, or associate degrees and 35% had earned graduate degrees. Nearly all (91%) were certified (87 COHN and 118 COHN-S). Most were between 46 and 65 years of age. Approximately half classified themselves as administrators. They worked in a variety of industries, mainly health care, manufacturing, and government. Few reported being self-employed (2%) or working in small clinics (16%). Most worked as employees of large corporations, government agencies, or medical centers.

Educational attainment was not strongly associated with certification. However, because such a high proportion of participants were COHNs, the ability to distinguish an effect from educational attainment was limited. Furthermore, the participants in this study with associate degrees, diplomas, or bachelor degrees may not be representative of all occupational health nurses with those particular levels of education if these nurses are less likely to attend national meetings.

Tables 2-4 summarize the activities reported by the participating nurses on their logs (typically sampling 15 times per nurse). These data were summarized in three ways. First, the proportion of all logs represented by an activity was calculated to represent the profession overall. Second, diversity among occupational health nurses was quantified by calculating the results for each nurse independently and then comparing individual nurses' averages across all participating nurses. Third, each nurse was classified dichotomously based on whether an activity was completed at least once ("ever").

Purpose of Activities

Table 2 shows the general purpose of the activities reported in the logs. Direct ("hands-on") client care was the most frequent single activity, although it accounted for only 22% of the overall sampled times. The 75th percentile for individual nurses' averages was 33% time, implying that only one-quarter of the nurses spent more than one-third of their time in direct client care. Nevertheless, most nurses (72%) reported at least one log (of 15) in which direct client care was the primary purpose. A sizable proportion (at least 25%) of participating nurses did not report any of their 15 logs being primarily related to direct client care.

Management activities accounted for 19% of nurses' time overall and 76% reported at least one episode primarily focused on internal management. External man-

Characteristic	n (%)
Gender	
Female	123 (96%)
Male	5 (4%)
Educational attainment	
Associate's degree	18 (14%)
Bachelor's degree	59 (46%)
Doctoral degree (PhD or similar)	1 (1%)
Master's degree	44 (34%)
Juris doctorate	1 (1%)
Registered nurse (Diploma)	6 (5%)
Certification (COHN or COHN-S)	
Certified	118 (91%)
Not certified	11 (9%)
Age (years)	
26 to 35	5 (4%)
36 to 45	12 (9%)
46 to 55	49 (38%)
56 to 65	58 (45%)
66 or older	5 (4%)
Region	
Northeast	26 (20%)
Southeast	28 (22%)
Midwest	39 (30%)
Southwest	16 (12%)
West	17 (13%)
Pacific	1 (1%)
National	1 (1%)
International	1 (1%)

agement (for companies other than the nurse's employer) was infrequent.

Communication and training together accounted for 20% of overall time commitment. Nearly all nurses (78%) reported at least one log for which communication was the major activity.

Although legal and regulatory activity was the primary focus in only 8% of all logs reported, the majority of nurses (56%) reported at least one time sample for which it was the primary activity. Assessing and controlling exposure each accounted for less than 4% of reported activities. However, the majority of nurses reported sampled time periods focused on assessing or controlling exposures (27% of the nurses forwarded at least one exposure-assessment log and 28% reported at least one exposure-control focused log).

The anticipated primary beneficiary of occupational health nurses' activities was most frequently a specific employee (29% of overall logs). In addition, 11% of the

TABLE 2
Activity Purpose Based on Work Sampling Logs^a

Category	Overall Time Analysis		Time % per OHN				Ever	
	n	%	Mean	Q1	Median	Q3	Range	% ≥ 1
General Category								
Control Exposure	54	3%	3%	0%	0%	7%	0 to 21	28%
Legal/Regulatory	152	8%	8%	0%	7%	13%	0 to 60	56%
Management (Internal)	358	19%	19%	7%	13%	27%	0 to 87	76%
My Personal Professional Development	128	7%	7%	0%	0%	13%	0 to 33	46%
Training	91	5%	5%	0%	0%	7%	0 to 40	43%
Assess Exposure	69	4%	4%	0%	0%	7%	0 to 60	27%
Communication	277	15%	15%	7%	13%	20%	0 to 53	78%
Management (For External Company)	32	2%	2%	0%	0%	0%	0 to 33	14%
Worker Care (Direct)	421	22%	23%	0%	20%	33%	0 to 100	72%
Worker Care (Indirect)	311	16%	16%	0%	13%	27%	0 to 67	73%
Payer								
My Employer	1,495	79%	79%	73%	88%	100%	0 to 100	95%
Another Company (for whom I consult)	123	7%	7%	0%	0%	0%	0 to 100	16%
Another Insurer (private, Medicare, etc.)	6	0%	0%	0%	0%	0%	0 to 20	3%
None/Self	128	7%	7%	0%	0%	7%	0 to 93	40%
Workers' Compensation	61	3%	3%	0%	0%	0%	0 to 60	18%
Legal	1	0%	0%	0%	0%	0%	0 to 7	1%
Other	75	4%	4%	0%	0%	0%	0 to 87	25%
Decline to Answer	2	0%	0%	0%	0%	0%	0 to 7	2%
Goal of Activity								
Consulting (Employer or Clinic)	34	2%	2%	0%	0%	0%	0 to 53	16%
Health Promotion	147	8%	8%	0%	0%	13%	0 to 93	47%
Legal or Workers' Comp (Not Treatment)	117	6%	6%	0%	0%	7%	0 to 87	41%
Management (For My Company)	224	12%	12%	0%	7%	20%	0 to 67	64%
Other	369	20%	19%	6%	13%	27%	0 to 93	75%
Personal Development	58	3%	3%	0%	0%	7%	0 to 20	29%
Regulatory Compliance (Nonclinical to Clinical)	141	7%	8%	0%	0%	7%	0 to 100	46%
Screening (Required to OSHA, FMSCA, DOT, etc.)	206	11%	11%	0%	7%	14%	0 to 73	52%
Screening (Voluntary)	44	2%	2%	0%	0%	0%	0 to 27	24%
Treat Injured/Ill person (Clinical)	185	10%	10%	0%	7%	13%	0 to 67	57%
Worker Fitness Evaluation	121	6%	6%	0%	0%	7%	0 to 60	40%
Worker Protection	208	11%	11%	0%	7%	20%	0 to 53	66%
Workplace Evaluation/Design	33	2%	2%	0%	0%	0%	0 to 27	17%
Direct Beneficiary								
Another Company (for whom I consult)	91	5%	5%	0%	0%	0%	0 to 100	19%
My Employer	517	27%	27%	13%	20%	40%	0 to 87	90%
Non to Workplace Environment	3	0%	0%	0%	0%	0%	0 to 7	2%
Other	218	12%	11%	0%	7%	20%	0 to 73	58%
Personal Professional Development	65	3%	3%	0%	0%	7%	0 to 33	33%
Society in General	39	2%	2%	0%	0%	0%	0 to 40	15%
Specific Company	211	11%	11%	0%	7%	13%	0 to 53	60%
Specific Worker/Employee	541	29%	28%	13%	27%	40%	0 to 87	88%
Workplace Environment	205	11%	11%	0%	7%	20%	0 to 60	64%

OHN = occupational health nurse

^aThis table summarizes activities reported by participating nurses. Results are shown for three metrics based on: (1) the overall distribution of nurses' time; (2) distributions of each individual nurse's activities; (3) "Ever": the proportion of nurses reporting this activity at least once among the 15 logs. Q1= first quartile, Q3 = third quartile.

TABLE 3
Activity Setting Based on Work Sampling Logs^a

Category	Overall Time Analysis		Time % per OHN				Ever	
	n	%	Mean	Q1	Median	Q3	Range	% ≥ 1
Where Act								
Clinical (e.g., clinic, medical office)	469	25%	25%	0%	7%	47%	0 to 100	53%
Corporate Office	298	16%	16%	0%	0%	7%	0 to 100	27%
Educational Institution	6	0%	0%	0%	0%	0%	0 to 13	4%
Other Office (nonclinical to clinical)	283	15%	15%	0%	7%	20%	0 to 100	53%
Other	203	11%	11%	0%	0%	3%	0 to 100	50%
Worksite	634	33%	33%	0%	13%	73%	0 to 100	65%
With Whom								
Working Alone	689	36%	36%	23%	33%	47%		94%
Safety Professional	93	5%	5%	0%	0%	7%		41%
Group of workers (not on my staff)	139	7%	7%	0%	0%	7%		45%
Industrial hygienist	19	1%	1%	0%	0%	0%		9%
Manager (nonclinical to clinical)	163	9%	9%	0%	7%	13%		53%
Worker (nonclinical to client)	187	10%	10%	0%	7%	13%		55%
Nurse	188	10%	10%	0%	0%	13%		43%
Manager (clinical)	68	4%	4%	0%	0%	0%		24%
MD/DO	78	4%	4%	0%	0%	7%		30%
Legal Representative	26	1%	1%	0%	0%	0%		11%
Nursing Assistant, LPN, LVN	51	3%	3%	0%	0%	0%		15%
Client	382	20%	20%	0%	13%	33%		67%
Physician Assistant	13	1%	1%	0%	0%	0%		4%
Nurse Practitioner	21	1%	1%	0%	0%	0%		10%
Tools								
Electrocardiogram	20	1%	1%	0%	0%	0%		6%
Audiometer	65	3%	3%	0%	0%	0%		22%
Phlebotomy	52	3%	3%	0%	0%	0%		19%
Record Keeping	167	9%	9%	0%	0%	13%		48%
Spirometer	41	2%	2%	0%	0%	0%		15%
Vision Tester	58	3%	3%	0%	0%	0%		18%
Computer	258	14%	14%	0%	7%	20%		73%
Personal Protective Equipment	0	0%	0%	0%	0%	0%		0%
Suture	1	0%	0%	0%	0%	0%		2%
First Aid	43	2%	2%	0%	0%	0%		19%

OHN = occupational health nurse

^aThis table summarizes activities reported by participating nurses. Results are shown for three metrics based on: (1) the overall distribution of nurses' time; (2) distributions of each individual nurse's activities; (3) "Ever": the proportion of nurses reporting this activity at least once among the 15 logs. Q1= first quartile, Q3 = third quartile.

nurses reported a specific worker to be the primary beneficiary. Because the online log system required selecting only a single choice for the primary beneficiary, this finding suggests that 40% of the nurses' work benefits a single individual. Nearly all (88%) reported at least one activity for which a specific employee was the primary beneficiary. Many reported that the employer was the intended primary beneficiary (20% overall, 90% of nurses reporting at least one such log).

The specific content of the activities is described by the "goal of the activity" data in Table 2 (note that

the percentages described below are likely to underestimate the actual proportion of time invested because 20% of the submitted logs were characterized by the nurses as "other"). Occupational health nurses undertake a diverse group of activities. Managing, treating injured or ill workers, screening workers as mandated by regulation or law, and providing worker protection constituted the largest proportion of nurses' professional efforts. More than half of the nurse participants reported at least one activity for which the primary aspect was treating an individual with an injury or illness and 52% had at least one activ-

TABLE 4
Activity Conditions Based on Work Sampling Logs^a

Category	Overall Time Analysis		Time % per OHN				Ever	
	n	%	Mean	Q1	Median	Q3	Range	% ≥ 1
Body System								
Not Applicable	938	50%	50%	27%	50%	67%	0 to 100	96%
Pulmonary	122	6%	6%	0%	0%	13%	0 to 100	46%
Acute Injury	79	4%	4%	0%	0%	7%	0 to 80	28%
Toxicology	26	1%	1%	0%	0%	0%	0 to 13	19%
Musculoskeletal (other than spine)	133	7%	7%	0%	0%	13%	0 to 47	46%
Infection	81	4%	4%	0%	0%	7%	0 to 47	31%
Other Internal (Gastrointestinal, Renal, Endocrine)	35	2%	2%	0%	0%	0%	0 to 27	16%
Skin (Dermatology)	19	1%	1%	0%	0%	0%	0 to 27	11%
Musculoskeletal (spine)	67	4%	4%	0%	0%	7%	0 to 47	28%
Cardiovascular	50	3%	3%	0%	0%	0%	0 to 27	23%
Healthy Examination	105	6%	6%	0%	0%	7%	0 to 47	41%
Psychological	20	1%	1%	0%	0%	0%	0 to 22	11%
Reproductive	3	0%	0%	0%	0%	0%	0 to 7	2%
Other	184	10%	10%	0%	7%	13%	0 to 80	53%
Don't Know	29	2%	2%	0%	0%	0%	0 to 27	14%
Hazard Type								
Not Applicable	870	46%	46%	27%	40%	60%	0 to 100	96%
Chemical	43	2%	2%	0%	0%	0%	0 to 27	19%
Safety	299	16%	16%	0%	13%	20%	0 to 73	71%
Infectious Biologic Agents	145	8%	8%	0%	0%	7%	0 to 100	36%
Ergonomics	99	5%	5%	0%	0%	7%	0 to 80	38%
Carcinogen	11	1%	1%	0%	0%	0%	0 to 20	5%
Other	225	12%	12%	0%	7%	14%	0 to 67	63%
Mold	1	0%	0%	0%	0%	0%	0 to 7	1%
Personal Lifestyle Factors (e.g., diet)	95	5%	5%	0%	0%	7%	0 to 40	36%
Stress	42	2%	2%	0%	0%	0%	0 to 33	21%
Skin Contact	28	1%	1%	0%	0%	0%	0 to 27	16%
Unknown	35	2%	2%	0%	0%	0%	0 to 33	20%

OHN = occupational health nurse

^aThis table summarizes activities reported by participating nurses. Results are shown for three metrics based on: (1) the overall distribution of nurses' time; (2) distributions of each individual nurse's activities; (3) "Ever": the proportion of nurses reporting this activity at least once among the 15 logs. Q1 = first quartile, Q3 = third quartile.

ity of mandated screening. Health promotion represented only 8% of nurses' time, but nearly half (47%) provided health promotion activities at least once.

The source of payment for professional activities is summarized in **Table 2** and **Table 5**. These results represent the underlying source of payment, not the direct payment to the nurses (e.g., even if the nurses were salaried employees of a clinical provider group, workers' compensation might be described as the penultimate payer for their work).

Payment sources for the occupational health nurses' activities were remarkably homogeneous. "My employer" paid for 79% of the services. For some activities, the work was self-funded (7%). It is possible that some

nurses may have misattributed payment if they were salaried. However, "workers' compensation," the major payment source for clinical services in occupational health, is not likely to be significantly underestimated because only 10% of activities were focused on treating a specific injured or ill worker.

Work Context

Table 3 summarizes characteristics of the work setting. Occupational health nurses interacted most frequently with other clinical health professionals and with workers. Interactions with nonclinical occupational health professionals were less common. Direct interactions were reported in 64% of nurses' activity logs. Of

TABLE 5
Payment Sources by Activity Category^{a,b}

Category	Another Company	Legal	My Employer	None	Other	Workers' Comp	Another Insurer	Total
Activity								<i>p</i> < .0001
Assess Exposure	5 (7%)	0 (0%)	60 (87%)	4 (6%)	0 (0%)	0 (0%)	0 (0%)	69
Communication	14 (5%)	0 (0%)	225 (82%)	22 (8%)	12 (4%)	2 (1%)	0 (0%)	276
Control Exposure	3 (6%)	0 (0%)	47 (87%)	1 (2%)	3 (6%)	0 (0%)	0 (0%)	54
Legal/Regulatory	9 (6%)	1 (1%)	136 (89%)	1 (1%)	1 (1%)	4 (3%)	0 (0%)	152
Management (For External Co.)	13 (41%)	0 (0%)	15 (47%)	1 (3%)	2 (6%)	1 (3%)	0 (0%)	32
Management (Internal)	6 (2%)	0 (0%)	328 (92%)	12 (3%)	6 (2%)	4 (1%)	2 (1%)	358
My Personal Professional Development	3 (2%)	0 (0%)	44 (34%)	60 (47%)	20 (16%)	1 (1%)	0 (0%)	128
Patient Care (Direct)	35 (8%)	0 (0%)	331 (79%)	9 (2%)	19 (5%)	25 (6%)	1 (0%)	420
Patient Care (Indirect)	30 (10%)	0 (0%)	237 (76%)	15 (5%)	3 (1%)	23 (7%)	2 (1%)	311
Training	5 (5%)	0 (0%)	72 (79%)	3 (3%)	9 (10%)	1 (1%)	1 (1%)	91
Payment Sources by Primary Beneficiary								<i>p</i> < .0001
Another Company (for whom I consult)	62 (68%)	0 (0%)	19 (21%)	3 (3%)	3 (3%)	4 (4%)	0 (0%)	91
My Employer	0 (0%)	1 (0%)	486 (94%)	15 (3%)	5 (1%)	10 (2%)	0 (0%)	517
Non Workplace Environment	0 (0%)	0 (0%)	1 (33%)	2 (67%)	0 (0%)	0 (0%)	0 (0%)	3
Other	2 (1%)	0 (0%)	129 (59%)	55 (25%)	29 (13%)	3 (1%)	0 (0%)	218
Personal Professional Development	1 (2%)	0 (0%)	38 (58%)	22 (34%)	4 (6%)	0 (0%)	0 (0%)	65
Society in General	0 (0%)	0 (0%)	28 (72%)	4 (10%)	7 (18%)	0 (0%)	0 (0%)	39
Specific Patient	23 (11%)	0 (0%)	149 (71%)	10 (5%)	7 (3%)	18 (9%)	3 (1%)	211
Specific Worker/Employee	30 (6%)	0 (0%)	458 (85%)	10 (2%)	15 (3%)	25 (5%)	3 (1%)	541
Workplace Environment	5 (2%)	0 (0%)	186 (91%)	7 (3%)	5 (2%)	1 (0%)	0 (0%)	205

^aThe table summarizes the payment sources according to the general nature of an activity at a specific time and according to the primary anticipated beneficiary of the nurse's efforts for the specific time. Results are based on all submitted logs and are shown as number of logs and percentage of support from each source for each activity.

^bResults were statistically significant for both aspects.

these, most were with other clinicians such as nurses or physicians (e.g., 14% with nurses). Conversely, only 1% of activities involved interaction with an industrial hygienist, 4% with a safety professional, and 8% with a nonclinical manager. Only 14% of occupational health nurses' logs had at least one interaction with an industrial hygienist, although more interacted at least once with a safety professional (45%).

Nurses worked most frequently in clinical (25%) or worksite (33%) settings. The majority of occupational health nurses spent at least some time at worksites.

Nurses were asked to specify the tools with which they work for each reported activity. Salient results are summarized in **Table 4**. The most frequently used tools were computers and recordkeeping items. A significant proportion used specialized equipment at least once: spirometers (15%), audiometers (22%), and vision testing equipment (18%).

Health Conditions and Hazards

Table 4 summarizes primary clinical conditions and workplace hazards reported by study participants. The clinical areas most frequently reported were musculoskeletal, pulmonary, and infectious disease-related. Consistent patterns were identified for overall distributions based on whether nurses had dealt with this problem at least once ("ever" in **Table 2**). For example, 46% reported at least one period for which pulmonary problems were the main reason for the visit. These nurses dealt with an array of organ system-related problems; in addition, half of the tasks sampled did not apply to a single organ system. Approximately half of the logs referred to a specific hazard. Safety, ergonomic, and infectious agents were most frequently mentioned.

Table 5 illustrates the relationship between the nature of activities and payment sources according to two

characteristics: general purpose of the activity and anticipated primary beneficiary. Although payment by “my employer” was the most common source, statistically significant differences were found. Notably, payment for nurses’ personal professional development was least often paid by the employer. Care of specific workers had the highest proportional payment from workers’ compensation insurance, suggesting general validity of participants’ reporting.

DISCUSSION

Occupational health nurses are a vital component of the professional workforce protecting and improving workers’ health, constituting approximately 9% of the occupational health workforce (McAdams, Kerwin, Olivo, & Goksel, 2011) and 0.7% of all registered nurses (Thompson & Wachs, 2012).

Importance of Clinical Competencies

Occupational health nurses use extensive clinical skills in both direct and indirect employee care. A significant proportion of occupational health nurses are involved in direct client care; nurses have direct contact with workers and are responsible for providing their care. In addition to skills necessary for treating injured or ill individuals, occupational health nurses require a broader set of clinical skills. Screening examinations, both mandatory and voluntary, accounted for as much clinical work as did injury and illness care. Furthermore, clinical work may be included in several other categories within **Table 2** (e.g., worker protection and worker fitness evaluations).

Some occupational health nurses do not provide direct clinical care. The activity logs showed that 28% had no direct care work. This finding is consistent with a Health Resources and Services Administration survey of self-reported activities of registered nurses, which found that 14% of occupational health nurses provided no “direct client services” (Thompson & Wachs, 2012). However, many occupational health nurses reported indirect client care activities accounting for 16% of their time. Even for indirect client care such as facilitating referrals or quality assurance, a thorough understanding of clinical practice is still necessary. To provide indirect client care, the occupational health nurse must significantly affect the care of a worker even though the nurse does not personally provide the specific diagnostic or therapeutic care for the individual. For example, indirect client care includes advising other providers about proper approaches to care delivery, arranging necessary treatment provided by others, or administering services that affect workers’ care.

These empirical data therefore support the need for excellent clinical education and testing of clinical skills as part of the certification process. Preparation for a career in occupational health nursing should include the development of specific clinical skills unique to occupational health nursing practice rather than relying on general nursing education and experience. For example, screenings mandated by Occupational Safety and Health Administration regulations and worker fitness assess-

ments are uniquely part of occupational health nursing practice and are unlikely to be adequately addressed in general nursing education. **Table 2** shows that specialized equipment such as vision testing equipment, spirometers, and audiometers are used by a significant proportion of occupational health nurses; continuing education programs should ensure competency in the use of these instruments.

Because some nurses enter the field of occupational health nursing laterally (transferring from other areas of nursing practice), both education and evaluation of competency for the most relevant clinical skills may be needed. Organizations such as professional affinity groups (e.g., American Association of Occupational Health Nurses) and certification organizations (e.g., American Board of Occupational Health Nurses) have particular responsibilities that differ from state licensing boards and more general nursing organizations. In addition, although earning a Master of Public Health, Master of Nursing, or Doctor of Nursing Practice degree can provide a perspective on many aspects relevant to occupational health nursing, a public health or nursing graduate education in itself may not provide the necessary discipline-specific clinical skills unless the program is focused on occupational health nursing.

Management Skills

In addition to clinical expertise, occupational health nurses typically require management skills. The activity logs’ summary indicates that 21% of nurses’ time is explicitly devoted to management. This finding probably underestimates the need for management skills in occupational health nursing practice because the application of management principles is requisite to practice in other areas.

The management skills needed for occupational health nursing practice may differ from general nursing management skills (e.g., understanding the regulatory context of occupational health practice) (American Association of Occupational Health Nurses, 2013). Furthermore, interaction among occupational health managers may require different skills than those needed in other areas of nursing practice. Nursing management in health care delivery systems (e.g., medical centers) typically does not involve the diversity of perspectives necessary to provide quality care in factories and other workplaces. Therefore, occupational health nursing-specific education and certification for management is needed rather than relying on general nursing management education.

Although working with industry managers is essential, nearly all of the interactions summarized in **Table 2** were with clinical professionals. Encouraging occupational health nurses to move beyond their comfort zones of purely clinical interactions should facilitate multidisciplinary efforts to improve worker health and productivity. Occupational health nurses’ clinical expertise can provide unique perspectives to nonclinical occupational health professionals and company management.

Work Settings

Occupational health nurses are predominantly employees of large companies or medical centers. Sources of payment for services, summarized in **Tables 2-3**, include the nurses' employers directly paying for most services. Because treating injured and ill employees constitutes only a small proportion of activity time, it is unlikely that workers' compensation insurance systems account for a significant part of occupational health nurses' compensation. This finding differs from the role of workers' compensation in occupational physician practices (Harber et al., 2010a). Hence, by both employment relationship and services provided, occupational health nurses are typically company employees.

Unique Aspects of the Current Study

Several publications have identified practice patterns and educational approaches for occupational health nurses (American Association of Occupational Health Nurses, 2012, 2013; Institute of Medicine, 2000; Thompson & Wachs, 2012). The current study provides new information not otherwise available for several reasons.

The results are based on a national sample of occupational health nurses. Another large study was conducted by the Health Resources and Services Administration (Thompson & Wachs, 2012). This 2008 national survey of registered nurses included a sample of 247 occupational health nurses; 0.7% of registered nurses are occupational health nurses. Although this study sample is smaller (128), the information gathered is more in-depth. Furthermore, this study did not rely on self-reported overall estimates of activity frequency, but rather derived its estimates from multiple logs submitted by each nurse.

Study data were based on activity logs submitted by occupational health nurses; each log described the work completed at a particular point in time. As such, the results are less subject to recall bias than surveys asking respondents to provide global estimates with the inherent difficulty of estimating overall distributions (e.g., it is easier to accurately describe one's activities at one moment in time than to estimate the proportion of time overall). Securing multiple logs from each respondent and securing a large number of participants overcomes the potential concern that an individual point in time may not be representative.

The activity log approach is purely empirical and does not depend on the opinions of "experts" (American Association of Occupational Health Nurses, 2013). The sister study of physicians showed significant incongruities between the opinions of many authors and the empirical data (Harber et al., 2010a).

This approach also assesses working relationships at the level of the individual activity. For example, the general category of a specific activity can be related to the payer for that specific activity; these relationships may not be obvious if only data about the frequency of a group of activities and the overall distribution of payment sources were collected.

Implications for Occupational Health Nurses

The study results have several implications for occupational health nursing. First, actual practice in this profession requires specific skills, many of which are unlikely to be routinely mastered by nurses in other nursing disciplines. Nurses entering the field of occupational health nursing have a significant need for educational programs specific to occupational health practice, as well as ways to transfer their practice skills from other nursing specialties. Nurses who practice occupational health nursing must accept responsibility for acquiring necessary competencies, whether through formal academic programs or continuing professional education.

Second, clinical skills are necessary. Direct "hands-on" clinical care is provided by many occupational health nurses. In addition, managerial roles still require clinical understanding because of the frequent impact of indirect care responsibilities on worker health and safety.

Third, management activities are common among experienced occupational health nurses. Educational programs should prepare new occupational health nurses for management and clinical roles that include the diagnosis and treatment of illness and injury and an understanding of the regulatory and public health context of occupational health practice. Certification examinations should also include both the experiential and knowledge requirements of occupational health nursing practice.

Fourth, experienced occupational health nurses frequently work in corporate settings or in employee health centers. The organization of work and the types of individuals with whom they interact in such settings may differ from those in hospitals and ambulatory care clinics. Experience, formal education, and continuing education should assist nurses in developing necessary skills.

CONCLUSION

Occupational health nurses use multiple skills and have varied practices, including both clinical and non-clinical areas of competency. Their close relationships with workers and worksites affords unique opportunities to use these skills.

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