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ORIGINAL RESEARCH

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How Long and How Much Are Nurses Now Working?

Too long, too much, and without enough rest between shifts, a study finds.

Abstract

Objective: Extended work schedules—those that vary from the standard eight hours per day, 35 to 40 hours per week—are common in nursing and contribute to problems with nursing recruitment and retention, in addition to compromising patient safety and the health and well-being of nurses. This study describes the nature and prevalence of such schedules across nursing settings.

Methods: Quantitative survey data collected as part of the Nurses Worklife and Health Study were analyzed. The sample consisted of 2,273 RNs. Demographic data, information about respondents' primary jobs (position, workplace, and specialty), and specific work schedule variables were analyzed, including data on off-shifts, breaks, overtime and on-call requirements, time off between shifts, and how often respondents worked more than 13 hours per day and on scheduled days off and vacation days. Respondents were also asked about activities outside of work, commuting time, and other nonnursing activities and chores.

Results: More than a quarter of the sample reported that they typically worked 12 or more hours per day, as did more than half of hospital staff nurses and more than a third of those with more than one job. A third of the total sample worked more than 40 hours per week, and more than a third worked six or more days in a row at least once in the preceding six months. Nearly a quarter rotated shifts.

Almost one-quarter of nurses with more than one job worked 50 or more hours per week, and they were more likely to work many days consecutively, without sufficient rest between shifts, and during scheduled time off. Single parents were as likely as those with more than one job to work 13 to 15 hours per day, 50 to 60 hours or more per week, and many days consecutively. Seventeen percent of all nurses worked mandatory overtime, as did almost a quarter of the single parents. Nearly 40% of the total sample and more than 40% of hospital staff nurses had jobs with on-call requirements.

Conclusions: The proportion of nurses who reported working schedules that exceed the recommendations of the Institute of Medicine should raise industry-wide concerns about fatigue and health risks to nurses as well as the safety of patients in their care.

Key words: nurse staffing, adverse outcomes, extended work schedules, patient safety, nurse health

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Dramatic changes have occurred in the health care industry in the past decade, largely because of an increased emphasis on reducing costs. Nurses, the largest segment of the health care workforce, are greatly affected by these changes.[1-3] Many health care facilities have eliminated jobs, resulting in extended work schedules for those nurses who remain. "Extended work schedule" is defined as a schedule that varies from the standard one of eight hours per day, 35 to 40 hours per week—for example, long work hours, irregular schedules, on-call requirements, mandatory overtime, and rotating shifts, or combinations of these. Research has shown that such scheduling practices have been used not only to address staffing crises but as a tool to meet daily staffing requirements.[4] According to the Institute of Medicine (IOM) report *Keeping Patients Safe: Transforming the Work Environment of Nurses,* nurses' actual work times exceeded scheduled work times by more than one hour per day, on average.[3] The use of extended work schedules, compounded by the current nursing shortage, is certainly problematic for the profession, because they affect nursing recruitment and retention.[5] Aiken and colleagues' 1998–1999 survey of more than 43,000 nurses in five countries found that 17% to 39% of respondents planned to leave their job within a year because of job demands.[6]

Recent literature has shown the detrimental effects of extended work schedules and excessive job demands on the health of nurses.[1, 7-11] Increased hours in a work environment with high physical and psychosocial demands can adversely affect nurses' health. In fact, chronic stress over time is known to adversely affect the neurologic, immune, and cardiovascular systems.[12, 13] Injuries from chronic exposure to high job demands are also more likely in nurses who work longer hours; more than one-third of approximately 1,400 RNs with active licenses had extended work schedules, which were associated with an increased likelihood of musculoskeletal injuries and disorders.[10]

An extended work schedule can lead to fatigue, pain, and deficits in performance and reaction time, as a result of increased exposure to physical demands and insufficient recovery time.[14-18] Reduced rest and recovery time leads to physiologic depletion or exhaustion that continues into the next workday.[19] Long work hours are also associated with unhealthful behaviors such as smoking, excessive caffeine intake, alcohol consumption, poor diet, and a lack of exercise.[20]

Studies of physicians in training also indicate that extended work schedules are associated with problems in job performance, with many reporting mistakes made as a result of fatigue.[21] In two of the studies, the longer physicians worked with inadequate sleep, the more their performance was affected, including the ability to make decisions, the time it took to complete tasks, and the rate of errors.[22, 23] In another study, surgical residents reported that their extended hours interfered with their ability to provide care.[24] Similarly, Rogers and colleagues found that hospital nurses who work extended hours are more likely to make errors that could adversely affect patient safety.[25]

When nurses are required to work overtime, particularly mandatory overtime on short notice, they can't anticipate the long workday and pace themselves accordingly.[26] Many nurses work in positions that have on-call requirements, an arrangement that interferes with rest and recovery, reduces control over scheduling, and affects their social lives and commitments outside of the workplace.[27] The majority of nurses are women, who also may have other substantial responsibilities, including caring for children or other dependents and doing housework and other chores that limit for leisure time and rest.[28, 29] Such pressures can create conflicts between job and family.[30, 31]

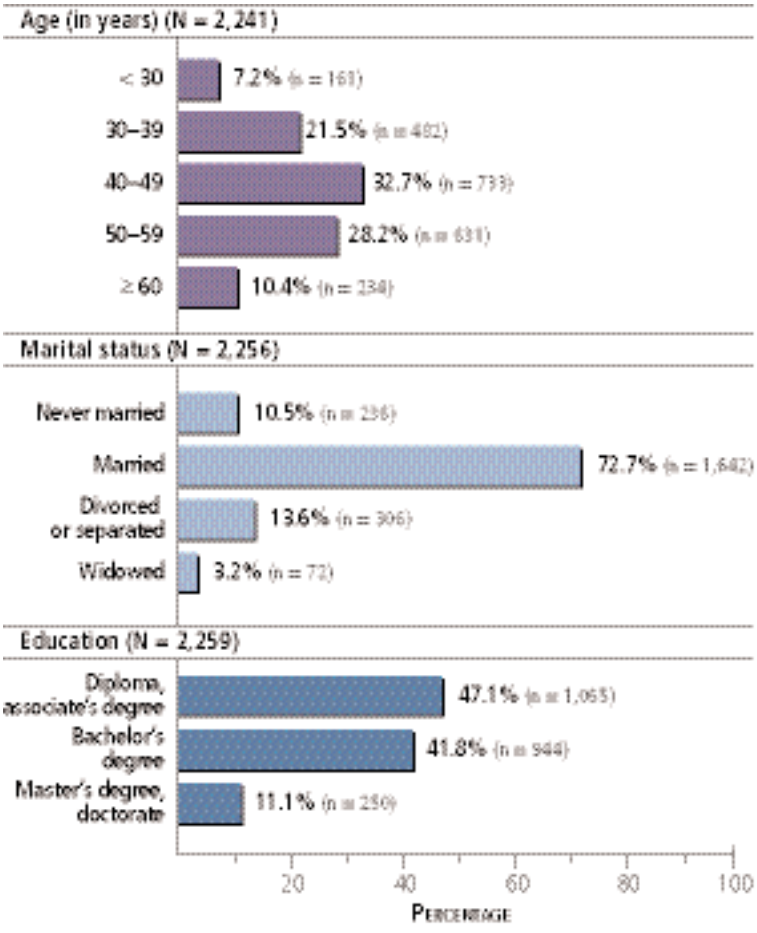
A substantial proportion of nurses reported working schedules that conflict with Institute of Medicine recommendations.

A well-rested nursing staff is essential to providing the best care possible. The American Association of Critical-Care Nurses recently issued a statement opposing mandatory overtime, because of its relation to job stress, physical fatigue, and exhaustion, which can lead to errors.[32] Currently, the IOM recommends that nurses work no more than 12 hours in a 24-hour period and no more than 60 hours in a seven-day period, in order to reduce error-producing fatigue.[3]

Although the current evidence indicates that extended schedules can adversely affect nurses and patients, research on nurse scheduling has been limited, usually to certain work settings (such as hospitals), or certain schedule components (such as shift work or mandatory overtime only); more research is needed. The Nurses Worklife and Health Study (Part II) was the first to link a wide array of schedule components with musculoskeletal injuries and disorders in nurses.[10] However, little is known about the prevalence of these extended work schedules across all nursing settings.

Therefore, we sought to describe the nature and prevalence of extended work schedules across the nursing profession. To enhance comparability with

FIGURE 1. DEMOGRAPHIC CHARACTERISTICS OF RN RESPONDENTS*



* N for each item (age, marital status, and education) is different from the total study N (2,273) because nonresponse rates for each question varied. The proportion of respondents who didn't answer these particular items ranged between 0.6% and 1.4%.

other research, we analyzed the schedules of several subgroups of nurses, including hospital staff nurses, those working more than one job, those who were single parents, and those 50 years of age and older. The proportion of nurses exceeding work hour limits proposed by the IOM was documented, along with recommendations for future research and policy directions.

METHODS

This study used quantitative survey data obtained as part of a longitudinal study of RNs funded by the National Institute of Occupational and Safety and Health (see *The Nurses Worklife and Health Study,* page 70). Data collection occurred between November 2002 and March 2003. The sample consisted of 2,273 randomly selected respondents in two states who worked as nurses during the preceding year. The mailed survey consisted of questions about various work schedule variables in the preceding six months, such as number of hours worked per day and per week, number of days worked per week, number of weekends worked per month, and overtime and on-call requirements. We also obtained demographic data that included work setting, position, and specialty. *More on Methods and Statistics* (page 64) provides additional information about the study methodology and data analysis.

RESULTS

Sample. The mean age of our sample of working nurses was 45 years. Our sample was predominantly female (95%), white (86%), and married (73%); nearly half (47%) held a diploma or associate's degree and 11% held a master's or doctoral degree (see Figure 1, at left—note that percentages given here are rounded to the nearest whole number; the percentages in the figures and the table are rounded to one decimal place). Almost 7% said they were black or African American and 5% said they were Asian or Pacific Islander. Slightly more than 1% said they were Hispanic. Half of the nurses were caring for children in the home, and 12% were caring for another dependent such as an elderly parent. The demographic distribution of the nurses in our sample closely approximated that of the 2000 *National Sample Survey of Registered Nurses*. The mean age in the national sample survey was 45 years; 95% were female, 12% were racial or ethnic minorities, 55% had children, and 72% were married.[42] As the highest level of education, our sample and the national sample survey reported equal proportions with master's or doctoral degrees (11%), although our sample had a lower percentage of nurses with diplomas or associate's degrees (47%) than the national sample survey (56%). The proportion of nurses who were single parents caring for children was 8%, exactly the same as the national sample survey estimate. Two-thirds (67%) of our study sample worked in staff-nurse, general-duty, or private-duty positions, and more than half (59%) worked in a hospital setting (see Figure 2, page 66), compared with 64% and 59%, respectively, in the national sample survey. In our sample, 19% of the nurses held more than one job, compared with 15% in the national sample survey. The distribution of specialties within the sample was consistent with a survey of 4,436 randomly selected RNs in 10 states that we conducted previously (the Nurses Worklife and Health Study [Part I])[43]; therefore, it's reasonable to suppose that our findings can be generalized to the national nursing population.

Work schedule. We focused on four subgroups within our sample: hospital staff nurses, nurses who held more than one job, nurses who were single parents, and nurses 50 years of age and older. Figure 2 describes the proportions of sampled nurses in the total sample and in the four subgroups

TABLE 1. PROPORTION OF RN RESPONDENTS WHOSE WORK HOURS EXCEED PROPOSED INSTITUTE OF MEDICINE LIMITS, BY POSITION, WORK SETTING, AND SPECIALTY*

	PERCENTAGE OF ALL RESPONDENTS TO THIS ITEM (n)	PERCENTAGE WHO WORK >12 HOURS/DAY	PERCENTAGE WHO WORK >60 HOURS/WEEK
POSITION (N = 2,270)			
Staff nurse, general duty	66.8 (1,516)	16.5	3.7
Manager, supervisor, other administrator	24 (545)	4.1	2.2
Advanced practice nurse (NP, clinical nurse specialist, certified nurse midwife, certified registered nurse anesthetist)	4.6 (104)	6.8	3
WORK SETTING (N = 2,271)			
Hospital	58.5 (1,328)	19.4	4.2
Ambulatory clinic, office, health maintenance organization	13.6 (309)	1	1.4
Nursing home, skilled nursing facility	7.7 (174)	5	1.9
Home health, hospice, assisted living facility	7.3 (165)	5.1	3.2
SPECIALTY (N = 2,257)			
Internal medicine, telemetry, medical–surgical not included in other specialties	16.3 (367)	15.9	5.3
Adult critical care (intensive care, cardiac care)	8.9 (200)	35.9	4.7
Operating room, ambulatory surgery	8.8 (199)	4.3	2.6
Women's health, labor and delivery	7.9 (179)	15.1	2.4
Family practice, other pediatrics	6.6 (150)	6.3	< 1
Emergency, trauma, triage	6.3 (143)	25.6	2.9
Psychiatric, mental health, substance abuse	5.8 (130)	5.7	1.7
Orthopedic, rehabilitation, neurology	3.9 (88)	1.2	3.8
Cardiac catheterization lab, diagnostics, hemodialysis	3.6 (82)	3.8	9
Neonatal, pediatric critical care	3.5 (79)	27.3	5.3
Oncology, transplantation, HIV and AIDS	3.1 (71)	14.3	4.3

* N for each item (position, work setting, and specialty) is different from the total study N (2,273) because nonresponse rates for each question varied. Fewer than 1% of respondents didn't specify their position, workplace, and specialty. Only the top four work settings, in terms of percentage of the total sample, and 11 selected specialties are represented. Specialties not included above are postanesthesia intensive care; case management, utilization review, discharge planning, administration; community health, occupational health, corrections; gerontology; school health; other.

who reported particular schedule variables. For example, 28.4% of the entire sample indicated that they typically worked 12 or more hours per day including overtime. Percentages were calculated based on nonmissing totals—in other words, the numbers of nurses who actually answered each question, rather than the total sample of 2,273 (the total number of respondents varied from question to question)—and the proportion missing for each schedule variable ranged from less than 1% to 6%. (Tersine, in a United States Census Bureau study of nonresponse rates for the 1996 American Commu-

More on Methods and Statistics

We conducted our analyses using quantitative survey data collected as part of Wave 1 of a longitudinal study of RNs funded by the National Institute of Occupational Safety and Health (NIOSH) (see *The Nurses Worklife and Health Study,* page 70). Approval was obtained from the institutional review board of the University of Maryland, Baltimore. Data were collected between November 2002 and March 2003, using a confidential mailed survey. (The questionnaire and survey procedures were designed and pilot tested as part of prior surveys on nurses' health.[10, 33, 34]) The survey consisted of an eight-page, optically scannable questionnaire. The mailing process consisted of an introductory letter, two questionnaire mailings, and a reminder postcard. A pen with the study logo and $2 were included in the first questionnaire mailing as incentives to respond, along with a postage-paid return envelope, as recommended by Dillman.[35]

Sample. For the recruitment process, 5,000 randomly selected nurses from licensure lists of two U.S. states were initially contacted to enroll in a three-wave longitudinal study. (The Wave 1 initial contact date was November 2002. The average time between the return of questionnaires from Wave 1 to Wave 2 was six months and, from Wave 1 to Wave 3, 15 months.) The states were selected to provide a sample with geographical and ethnic diversity that was representative of the whole U.S. RN population. Of those contacted, 138 had invalid addresses, and 633 declined to enroll. Two thousand six hundred twenty-four RNs out of the remaining 4,229 returned questionnaires, yielding a 62% enrollment rate. Only those who worked as nurses in the preceding year (N = 2,273) were included in this analysis.

Variables. Work-schedule variables were derived from the Standard Shiftwork Index, which has been used internationally to standardize self-reporting measures used in shift work research (Simon Folkard, PhD, DSc, written communication, February 4, 2002).[36, 37] Three work-schedule experts at NIOSH examined the survey for content validity (Claire C. Caruso, PhD, RN, Roger R. Rosa, PhD, and Steven L. Sauter, PhD, oral communication, September 2002). The U.S. Bureau of Labor Statistics has used similar methods since 2001 to measure typical work schedules, including usual hours worked and shift worked on "most days," as part of the U.S. Census Bureau report *Current Population Survey.* This indicates that the use of surveys to assess typical work schedules is accepted by qualified researchers and these methods are therefore appropriate for our study.

In reporting their work schedules, nurses were asked to consider their typical work schedule in all jobs held during the previous six months. The six-month period was chosen to minimize the chance that participants would provide responses that covered an unusual or atypical work period (as might happen if they were asked to report their schedules in the "past week"), thereby increasing the validity of schedule data, as had been done in other work schedule research.[38, 39] Also in keeping with previous research practice in this area, nurses were asked to report the hours they *actually* worked, including overtime, rather than the hours they were scheduled to work.[39, 40]

We collected data on the following work schedule variables: the number of hours worked per day and per week (the actual hours worked, including paid and unpaid overtime); the number of days worked per week; and the number of weekends worked per month. Space was provided on the questionnaire for respondents to write in the actual number of hours and minutes typically worked per shift. Participants were also asked to indicate the usual number of days they worked in a row and the most days they worked in a row without a day off. We included the question, *Do you work more than one job?,* to which respondents could answer yes or no. Respondents were also asked to check all shifts that they typically worked (days, evenings, nights). Those who worked "off-shifts" (any shift other than the day shift) were asked, *How are the off-shifts typically organized?* Response choices included occasional stretches per year, one or two stretches per month, some off-shifts every week, and off-shifts only. Schedule variables were measured using items from a work schedule index we designed previously.[10] To examine some of the more recent trends in extended work schedules, respondents were also asked to indicate how often they worked 13 hours or more at a stretch, with less than 10 hours off between shifts, and on a scheduled day off or vacation day; the response choices included never, a few times per year, once a month, every other week, once a week, or more than once a week. Respondents were also asked whether their job had an on-call requirement; those who answered yes were asked to indicate how often they were called into work, on average, and were given the same response choices (ranging from never to more than once a week).

About their primary job, respondents were also asked, *Does this job have mandatory overtime?* Those who answered yes were then asked to specify the amount of notice given: less than two hours' notice, two to eight hours' notice, or more than eight hours' notice. The questionnaire also asked, *During a typical workday, how many breaks lasting 10 minutes or more, including meals, do you take?* and provided 0, 1, 2, or 3+ breaks as response choices. Nurses were also asked about activities outside of work, including the average amount of time they spent traveling or commuting each day; the amount

of time they had to relax or pursue activities they enjoyed after an average work day; and the amount of time they spent per week on housework, child care, and other chores.

Position, workplace, and specialty for the nurses' primary or main job were recorded. Positions were classified as follows: staff, general duty; manager, supervisor, other administrator; advanced practice nurse (including NP, clinical nurse specialist, certified nurse midwife, and certified registered nurse anesthetist); educator, researcher; and other. Workplaces were classified as follows: hospital; nursing home, skilled nursing facility; ambulatory clinic, office, health maintenance organization; home health agency, hospice, assisted living facility; school of nursing; other school; government, community agency; business, industry; and other. The classification of specialties was consistent with that in our prior studies and included 16 specialty classifications plus "other" (see Table 1, page 63, for a complete list of specialties).

Data analysis. Data were analyzed using SPSS software, version 11.0. The distribution of each work-schedule, overtime, and on-call variable was analyzed using the total sample and then using the following subgroups: staff nurses working in hospitals (44.9%, n = 1,020); those working more than one job (19.4%, n = 440); single parents (8.4%, n = 188); and nurses older than age 50 (38%, n = 865). Missing data were handled using pairwise deletion (that is, in analyzing the correlation between any two variables, responses that didn't provide data on both variables were deleted, rather than substituting mean data). To test differences between subgroups and the total sample, we used the normal-theory method for a one-sample test for a binomial proportion.[41] (This method tests the hypothesis that a subgroup is significantly different from the total study population.)

The subgroup analysis was performed to determine whether these subgroups were disproportionately affected by extended work schedules, in comparison with the total sample. For example, hospital staff nurses might be more likely than others to have mandatory overtime or shift rotation as a job component. Single parents might work long hours to meet financial obligations, while older nurses might have better schedules because of their seniority. We examined the proportion of nurses in the entire sample who reported long work hours in relation to mandatory overtime and on-call requirements. We then repeated this analysis for hospital staff nurses only, using the Pearson χ^2 test of significance. Finally, the proportion of nurses who reported that they exceeded the maximum recommended by the IOM (more than 12 hours in 24 or more than 60 hours in seven days) was examined according to position, workplace, and specialty.

nity Survey, considered nonresponse rates of less than 7% not to be of concern or to warrant further analysis in terms of sample selection, instrument design, or other factors. Similarly, we considered nonresponse rates of less than 7% to all items in our questionnaire a strength of our study.[44])

Among all nurses in the sample (those working full and part time, across all work settings, and across all job types), one-third worked more than 40 hours per week: 19% worked 41 to 49 hours, 8% worked 50 to 59 hours, and 6% worked 60 or more hours (see Figure 2, page 66). Regarding days worked per week, 5% of respondents worked six or seven days per week consistently, although more than a quarter (29%) had worked six or more days in a row at least once in the previous six months. About 11% worked three or four weekends a month (this percentage may include weekend-only positions). Nearly a quarter of the nurses (23%) rotated shifts.

Nursing subgroup schedules. Hospital staff nurses constituted the largest subgroup of nurses examined. All subgroup comparisons described below were significant ($P < 0.001$), when the normal-theory method for a one-sample test for a binomial proportion was used. The hospital staff nurses were most likely to work 12 or more hours per day (52% versus 28% of the entire sample), although they were half as likely to work six to seven days per week, as compared with the total sample (2.6% versus 5.2%), suggesting that compression of the workweek into fewer, longer days was prevalent among this subgroup. They were also more likely to work off-shifts, as compared with the total sample.

Nurses with more than one job were more likely to work 12 or more hours per day (37% versus 28% of the total sample) and 50 or more hours per week (24% versus 14% of the total). Compared with the sample as a whole, they more often worked consecutive days without breaks for long stretches (9% worked 13 or more days in a row, versus 4% of the total), with insufficient rest (14% often worked with less than 10 hours off between shifts at least once per week, versus 8% of the total), and during scheduled time off (13% did so at least once per week, versus 5% of the total).

The work schedules of single parents with children were most similar to the schedules of those who often worked more than one job: both subgroups were as likely to report working long days (13 to 15 or more hours per day) (see Figure 3, page 68), long weeks (50 to 60 or more hours per week), and many consecutive days in a row. Compared with the total sample, they were more likely to work off-shifts, and with less than 10 hours off between shifts. Twenty-four percent of single parents had jobs that included mandatory overtime.

Nurses 50 years old and older were less likely to work long days (12 or more hours) than the over-

FIGURE 2. PROPORTION OF RN RESPONDENTS IN TOTAL SAMPLE AND FOUR SUBGROUPS REPORTING SELECTED WORK SCHEDULE CHARACTERISTICS (N = 2,273)*

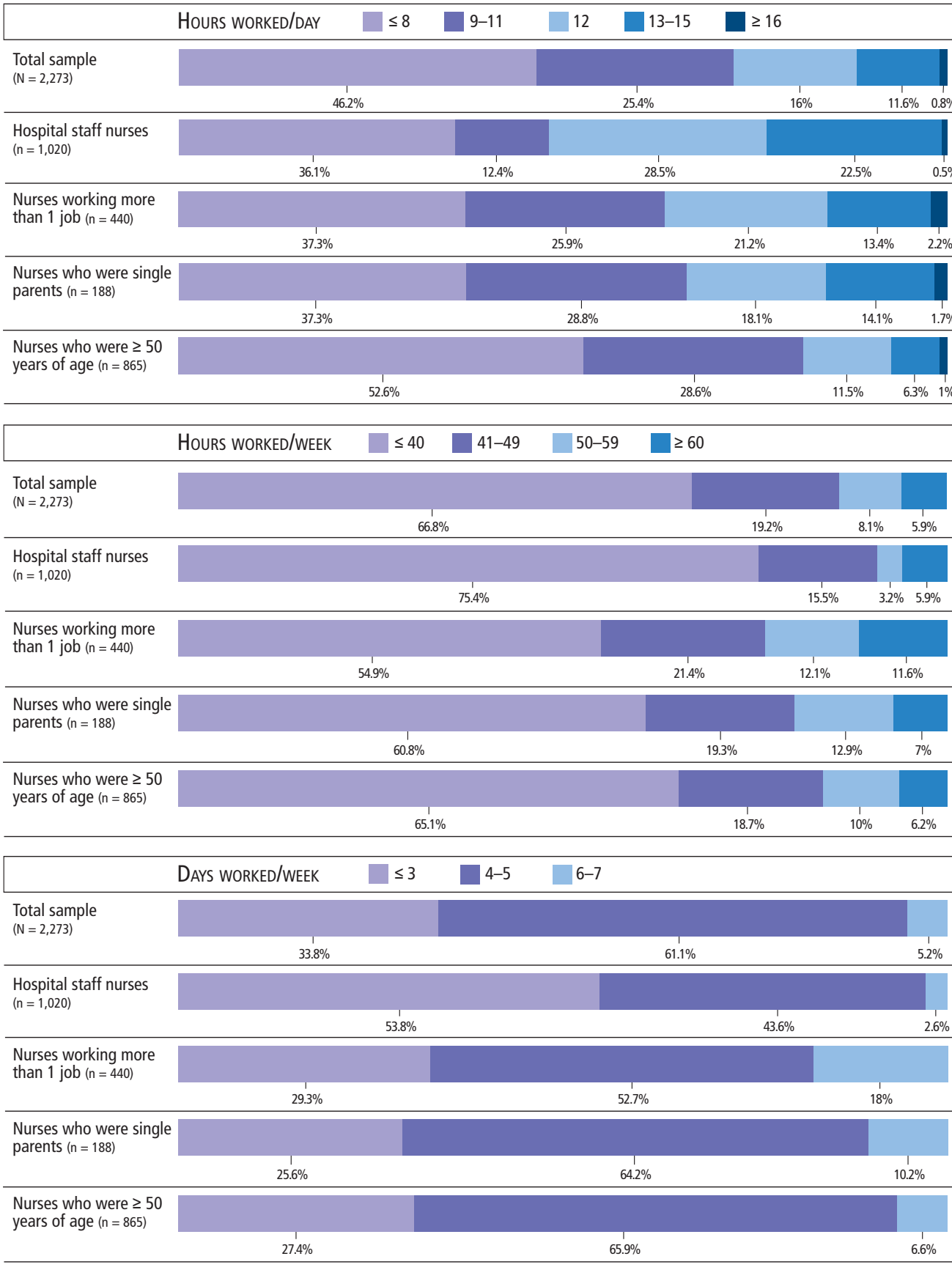
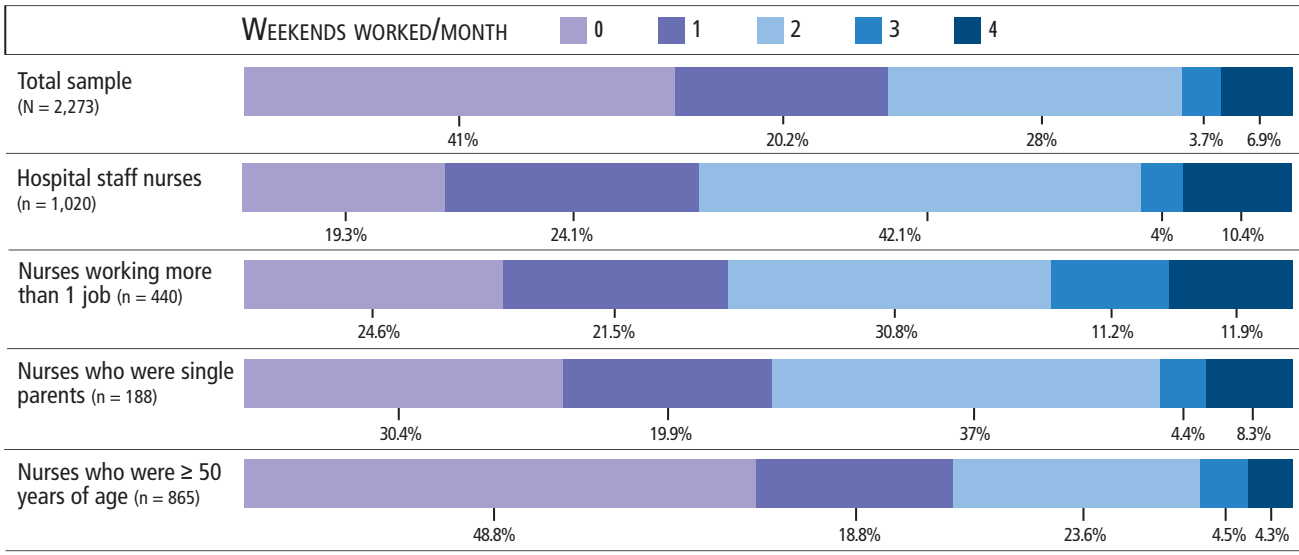


FIGURE 2. CONTINUED



* Percentages may not add up to 100% because of rounding. Work schedule characteristics represent the "typical work schedule" in the six months preceding the completion of the questionnaire.

all sample (19% versus 28%). They also had the highest proportion of nurses who worked days only (66%) and tended to work more days per week, as compared with the total sample.

Overtime, on-call status, breaks, other nonwork activities. For many nurses, time off the job was not well protected. In addition to regular work hours, 17% worked mandatory overtime, with two-thirds of these nurses required to do so with less than two hours' notice. Examining race, sex, ethnicity, and years of experience across the total sample, we found no significant differences in the proportions who reported working jobs with mandatory overtime, although nurses with master's or doctoral degrees were less likely to have jobs with mandatory overtime (Pearson χ^2 = 7.05, with 1 degree of freedom [df]; P = 0.004). In the analysis of hospital staff nurses, there were no differences in overtime worked when demographic characteristics were examined. Furthermore, there was no difference in the prevalence of mandatory overtime among hospital staff RNs, compared with the overall sample, those working more than one job, and nurses 50 and older. As was noted earlier, single parents were most likely to report working jobs with mandatory overtime (24%).

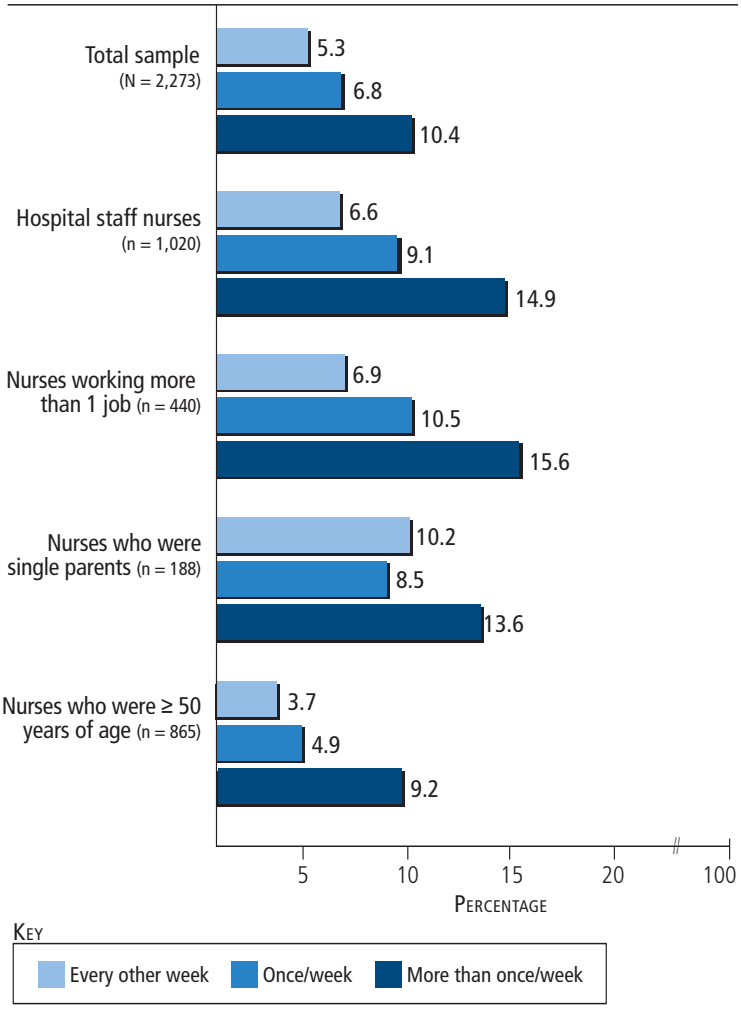
On-call requirements were very common among the total sample (38.6%, n = 877) and were even more prevalent among hospital staff nurses (43.5%). See Figure 4, page 69. In the total sample, among nurses with on-call requirements, 22% were called in monthly, 12% weekly, and 7% more than once a week, and we found similar percentages among the hospital staff nurses. Despite the long hours that nurses reported working, few took breaks; 11% of nurses reported that they typically took no breaks during their work shift. This figure varied little across the subgroups.

Among the total sample, those whose jobs included mandatory overtime worked significantly longer hours (Pearson χ^2 = 15.64, with 3 df; P = 0.004), whereas among hospital staff nurses, the proportion of those who worked mandatory overtime did not differ by hours worked per day (Pearson χ^2 = 5.06, with 4 df; P = 0.24). For on-call hours, the same pattern was seen: among the overall sample, on-call hours were directly related to hours worked per day (Pearson χ^2 = 32.10, with 4 df; P < 0.0001). Among hospital staff nurses, the proportion having on-call hours was not related to hours worked (Pearson χ^2 = 2.13, with 4 df; P = 0.71). Nonetheless, for both the overall sample and hospital staff nurses, jobs requiring on-call hours were significantly more likely to have mandatory overtime as well (Pearson χ^2 = 61.76 for the total sample and 29.49 for the hospital staff nurses, with 1 df for both groups; P < 0.0001 for both groups).

In other activities outside of work, 20% of our sample spent more than two hours per day commuting, and 31% spent more than 20 hours per week on housework or childcare chores or both. Leisure time was also limited: 27% reported that they had an hour or less per day to relax or pursue activities that they enjoyed.

Schedules compared to IOM recommendations. The data show that 17% of staff nurses, 4% of managers, and 7% of advanced practice RNs exceeded the IOM's proposed work-time guidelines on a regular basis. Compared with those in other workplaces, hospital nurses (19%) most frequently worked more than 12 hours; compared with those in other specialties, adult and pediatric critical care nurses were most likely to report working such schedules (36% and 27%, respectively), followed by ED nurses (26%). Four percent of staff nurses, most

FIGURE 3. PROPORTION OF RN RESPONDENTS WHO REPORTED WORKING 13 OR MORE HOURS PER DAY (N = 2,273)



of them working in hospitals, exceeded the recommendation of a maximum 60-hour workweek.

DISCUSSION

A substantial proportion of nurses reported working schedules that conflict with the recommendations of the IOM, with long hours, few days off, and little time off between workdays. The work schedules of nurses described in this survey suggest that there should be industry-wide concerns about fatigue and health risks to nurses as well as the safety of patients in their care. (Indeed, in one study, excessive overtime and fatigue were implicated in an outbreak of bacterial infection in a hospital environment.[45])

Rogers and colleagues reported that shifts of more than 12 hours tripled the risk of making an error.[25] Our findings complement and extend their hospital-based diary studies by contributing survey data on schedules from a large, population-based sample of nurses working in diverse settings. Because of the large sample, we were able to examine schedules among important subgroups of the nursing workforce, such as single parents. In addition, we collected new data on the occurrence of other adverse work-schedule factors, such as mandatory overtime, on-call hours, and working on a scheduled day off. Because there are few major studies in the emerging area of extended work hours and health among nurses, there is a need for more research into the specific schedule characteristics that might have an adverse effect on nurses' health.

For many nurses, these adverse working conditions don't occur singly but in combination, including frequent rotation, returning to work after insufficient time off, and working overtime on short notice or on scheduled days off. We found that jobs that included mandatory overtime were significantly more likely to have on-call requirements as well. Such combinations can make working extended hours unhealthy and even dangerous.[26] Rosa and colleagues found that shifts of 12 or more hours of continuous work were associated with greater reported fatigue and a decline in work performance over time.[46] (For more on the consequences of fatigue, see "Are You Tired?" *First Do No Harm*, March 2004.) In addition, some nurses have to provide care outside the workplace, juggling these responsibilities with extended work hours and other adverse conditions (for example, frequent rotation combined with consecutive long days or weekend work).

Even if nurses' work schedules are restricted to those that comply with the IOM's recommendations, there still may be health consequences, particularly if their schedules also contain other adverse components, such as shift rotation or mandatory overtime. Encouraging or requiring already tired nurses to work extra hours perpetuates a vicious cycle of fatigue, job change, and exit from the profession. This compounds staffing problems by creating shortages of nurses and the need for extended work hours. Conversely, improving nurses' working conditions has actually been shown to decrease vacancies and shortages, reducing the need to hire temporary staff nurses with their attendant higher costs.[47]

The fact that some nurses want to work long hours is sometimes given as a reason to encourage nurses to work extended hours. Our study asked whether nurses were required to work overtime, yet many nurses without such a requirement also reported working long hours. Studies of health effects of extended hours in other industries have found no correlation between those effects and whether extended hours are required or voluntary, suggesting that the health impact is comparable regardless of this distinction.[25] Other safety-sensitive industries, such as

long-distance trucking, have regulated work hours for the sake of public safety.

Because study data were based on self-reports, some possible limitations of the study should be considered. Other survey research, such as that of the Harvard Nurses' Health Study, has shown that nurses can provide valid and reliable data on their own risk factors and health outcomes.[48-50] Because our survey population was similar, we believe such findings support the appropriateness of using a survey design to measure scheduling. However, the findings of all studies that rely on self-reporting should be interpreted with caution. Self-reporting may be compromised by difficulty in recalling what actually occurred, as well as by other factors such as denial or deception. We limited the recall period for work schedules to six months, in part, to promote accurate recall. Other limitations included a lack of some detailed data, such as whether or not breaks taken by nurses were interrupted, nurses' reasons for holding more than one job, the consequences of refusing mandatory overtime, and whether nurses were compensated for all hours worked.

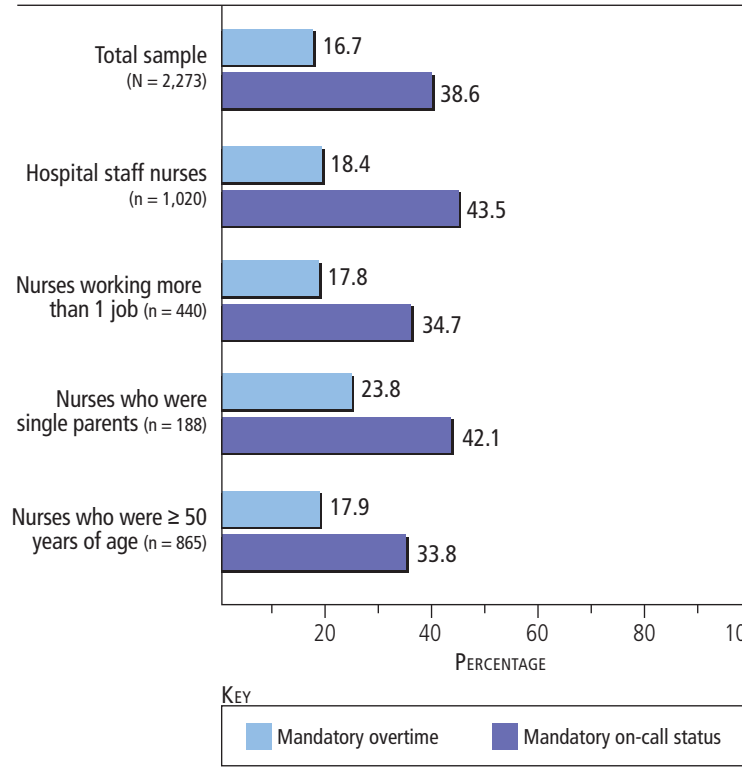
Another concern is possible nonresponse and selection biases: those who tend to participate in surveys may not resemble the population of RNs as a whole. Nonetheless, when we compared the characteristics of our respondents to those of the 2000 National Survey of Registered Nurses, distributions were very similar. Finally, because the analysis was limited to currently working nurses, we may have excluded nurses who had left jobs because of excessive scheduling demands or other health conditions that precluded their continuing to work such schedules. For that reason, our findings may be conservative.

Recommendations. Health care providers and legislators need to recognize the limits within which nurses can practice safely. Nursing leadership and health facility management should encourage adequate staffing by promoting optimal working conditions that appeal to employees and create loyalty and stability in the workforce. Data indicate that the extension of nurses' schedules beyond what they can comfortably and reasonably work is discouraging many nurses from remaining in the profession.[8]

Collective action is needed to improve scheduling. One nurse simply refusing to work mandatory overtime, for example, can jeopardize his or her livelihood.[51] Currently, 10 U.S. states have regulations or have passed legislation to prohibit mandatory overtime for nurses (California, Connecticut, Maine, Maryland, Minnesota, New Jersey, Oregon, Texas, Washington, and West Virginia). In addition, 15 other states have introduced such legislation (Colorado, Florida, Georgia, Hawaii, Illinois, Iowa, Massachusetts, Michigan, Nebraska, New York, Ohio, Pennsylvania, Rhode Island, Tennessee, and Vermont). Washington, California, and Maine have enacted laws protecting nurses who refuse to work more than 12 consecutive hours from disciplinary action.[52] Nurses in Maine must have 10 hours off duty before returning to work, with exemptions only during a declared public emergency.[53] At the federal level, bills to improve nurse staffing levels and limit the practice of mandatory overtime, known as the Safe Nursing and Patient Care Act of 2005 (HR 791; S 351), have been introduced. These efforts should be studied to examine their effects on nurse retention and shortages. The impact on actual schedules worked should also be examined.

Nurses prefer working in facilities with predictable work hours and schedules and appropriate patient loads.[5] Allowing them to have greater control of their work schedule may reduce the risk of future health problems,[54] but more data are needed on the impact of work schedule modifications. Furthermore, provision of more healthful scheduling with minimal overtime could address the nursing shortage by retaining and attracting nurses.[55] Nurses, employers, nursing organizations, and labor representatives can focus attention on this important issue

FIGURE 4. PROPORTION OF RN RESPONDENTS WHO REPORTED THAT THEIR PRIMARY JOB HAD MANDATORY OVERTIME OR ON-CALL HOURS (N = 2,273)



The Nurses Worklife and Health Study

The Nurses Worklife and Health Study is an ongoing program of research that examines how nursing work influences nurses' health. Alison Trinkoff, ScD, RN, FAAN, is the principal investigator. The research has been funded by the National Institute for Occupational Safety and Health (Parts II and III) and the National Institute on Drug Abuse (Part I). Each of the studies listed below used a different population-based sample of RNs, and data were collected using mailed surveys; response rates were good.

PART I (1993 to 1998). This cross-sectional study examined various aspects of nursing, such as specialty, work schedule, and job strain, on patterns of substance use among more than 4,400 RNs.

PART II (1998 to 2001). This cross-sectional study of 1,428 RNs from diverse settings looked at patterns of neck, shoulder, and back injuries and disorders in relation to physical demands, work schedule, and health care changes that influence nursing work (for example, increased job responsibility, floating off unit, unfilled positions, layoffs, high patient loads and acuity, shorter lengths of stay, and use of unlicensed personnel).

PART III (2001 to 2006). This longitudinal study of RNs was designed to obtain detailed information on work schedules, including long work hours, on-call and mandatory overtime requirements, working on scheduled days off, and shift rotation. The relationship of these scheduling factors to two important outcomes, musculoskeletal disorders and needlestick injuries, was also examined. Mailed surveys were used to examine variables at baseline and at six and 15 months. This allowed the researchers to make causal inferences about the effect of these work patterns on the incidence of musculoskeletal disorders and needlestick injuries. The current study used baseline data from 2,273 RNs who were working as nurses during the previous year.

and work to develop solutions to protect the health of nurses and patients. Studies examining the impact of such solutions will be important to carry out, in order to provide evidence-based information for policy makers and administrators. ▼

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