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ORIGINAL RESEARCH

Nurses' Presenteeism and Its Effects on Self-Reported Quality of Care and Costs

Survey findings indicate that presenteeism is costly in more ways than one.

Hospitals are under great pressure to provide high-quality patient care, despite decreasing revenues and the uncertainty surrounding pending health care reform legislation. As the principal caregivers in hospitals, nurses are crucial to this effort. Indeed, the research bears this out: a recent meta-analysis of 94 studies concluded that increased nurse staffing is associated with improved patient outcomes.[1] Although the meta-analysis didn't specifically look at nurses' productivity while on the job, it stands to reason that the level of productivity must also matter. Productivity can be adversely affected by both absenteeism (absence from work, usually illness related) and presenteeism (reduced on-the-job productivity as a result of health problems).[2] The costs associated with presenteeism are not only harder to track than those associated with absenteeism, they might also be greater.[3] Moreover, presenteeism may have a greater adverse impact on the quality of patient care. A nurse who calls in sick can be replaced with a healthy substitute; but a nurse who remains on the job despite ill health may not be able to fully meet its demands.

There has been little research into how nurses' health and level of productivity might relate to their ability to provide care. Two known causes of worker presenteeism are musculoskeletal pain and mental health issues, particularly depression.[4, 5] Our study investigated the extent to which musculoskeletal pain or depression (or both) in RNs affects their work productivity and self-reported quality of care provided and considered the associated costs.

REVIEW OF THE LITERATURE

Work productivity isn't well understood and no standard definition exists. It can be thought of generally as a relationship between inputs and outputs. But as O'Brien-Pallas and colleagues state, nursing outputs can be difficult to define and measure.[6] Therefore, they state, nursing productivity might be considered as "the relationship between nursing workload units and direct care worked hours," a definition initially proposed by the Canadian Institute for Health Information.[6] It's a flawed definition at best; the authors note that, although it "provides a framework for examining the relationship between the demands for service . . . and the amount of resources used to provide that service," it fails to consider the quality of the service provided. For the purposes of our study, we defined nursing productivity as the ability to accomplish and do one's work as carefully as usual, as measured by self-report.

Moreover, hospitals don't reliably report nursing productivity data, if they report it at all.[6] Research has demonstrated that adequate nurse staffing in hospitals is associated with fewer complications and adverse events, shorter hospitalizations, lower mortality rates, and greater job satisfaction.[7-12] Many health conditions are known to affect work productivity.[2, 13] In a study of hospital-employed RNs, 22% reported having a chronic health problem, and this was predictive of decreased productivity.[14] A Swedish study found that the occupations with the highest rates of "sickness presenteeism" included nurses, teachers, and welfare workers.[15]

The literature describes two types of presenteeism: that associated with acute illnesses such as allergic

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ABSTRACT

Objective: Although research has been conducted on how nurse staffing levels affect outcomes, there has been little investigation into how the health-related productivity of nurses is related to quality of care. Two major causes of worker presenteeism (reduced on-the-job productivity as a result of health problems) are musculoskeletal pain and mental health issues, particularly depression. This study sought to investigate the extent to which musculoskeletal pain or depression (or both) in RNs affects their work productivity and self-reported quality of care and considered the associated costs.

Methods: Using a cross-sectional survey design, a random sample of 2,500 hospital-employed RNs licensed in North Carolina were surveyed using a survey instrument sent by postal mail. Specific measures included questions on individual and workplace characteristics, self-reported quality of care, and patient safety; a numeric pain rating scale, a depression tool (the Patient Health Questionnaire), and a presenteeism tool (the Work Productivity and Activity Impairment Questionnaire: General Health) were also incorporated. A total of 1,171 completed surveys were returned and used for analysis.

Results: Among respondents, the prevalence of musculoskeletal pain was 71%; that of depression was 18%. The majority of respondents (62%) reported a presenteeism score of at least 1 on a 0-to-10 scale, indicating that health problems had affected work productivity at least "a little." Pain and depression were significantly associated with presenteeism. Presenteeism was significantly associated with a higher number of patient falls, a higher number of medication errors, and lower quality-of-care scores. Baseline cost estimates indicate that the increased falls and medication errors caused by presenteeism are expected to cost $1,346 per North Carolina RN and just under $2 billion for the United States annually. Upper-boundary estimates exceed $9,000 per North Carolina RN and $13 billion for the nation annually.

Conclusion: More attention must be paid to the health of the nursing workforce to positively influence the quality of patient care and patient safety and to control costs.

Keywords: depression, nurse health, pain, presenteeism, productivity, quality of care

conditions, colds, and pregnancy, and that associated with chronic conditions, such as arthritis, lung disease, and mental health disorders. Large population studies indicate that two major causes of the second type of presenteeism are musculoskeletal pain and mental health issues (primarily depression).[5, 16, 17] With regard to nurses, one study found that "the prevalence of reported neck, shoulder, and back musculoskeletal-disorder cases among [RNs] was 20%, 17%, and 29%, respectively."[18] Another study found that 39% of nurses had had low back pain at least once within the last year.[19] Other studies have reportedly found the prevalence of self-reported musculoskeletal disorders among nurses to be as high as 62% to 89%.[20] And two large studies demonstrated that work stress precipitated depression in working women and men, although neither study looked specifically at nurses.[21, 22]

Presenteeism and musculoskeletal pain. Arthritis and musculoskeletal pain are common health problems in adults. Arthritis is more common in women, affecting an estimated one in four adult women and one in six adult men, and prevalence increases with age.[23] In a study of arthritis and work productivity, Burton and colleagues surveyed a national sample of 16,651 workers; 15% reported having arthritis and 40% of these reported receiving medical care (medications or other forms of care) for the condition.[24] The employees with arthritis who were receiving such care demonstrated a 2.5% excess productivity loss, compared with employees without arthritis. Ricci and colleagues conducted a national telephone survey of 320 workers with back pain and 91 matched workers without back pain (mean age, 51 years).[25] Those with back pain were more likely to be female and older. Of the workers with back pain, 72% reported significant activity limitations; and 17% reported lost productive time, of which 80% occurred as presenteeism.

Mannion and colleagues surveyed 2,507 Swiss adults to determine the perceived impact of back pain on work productivity.[26] The study group was limited to the 670 respondents who reported both having back pain at present and being currently employed. Of those, 168 (25%) reported decreased productivity while at work. Howard and colleagues studied 2,191 workers with a chronic disabling musculoskeletal disorder, dividing them into two groups, presentees (those either working more than 20% of the time for more than three months after injury or working at the time of admission) and absentees.[27] Compared with absentees, presentees were more likely to be female, white, and more highly educated. Interestingly, absentees were more likely to develop mental health disorders. Gucer and colleagues surveyed 71 nursing assistants and other "nursing personnel" working as caregivers in long-term care facilities.[28] All were female, with an average age of 42 years; 79% were African American. Fifty-six (79%) reported working with musculoskeletal pain within the last nine months. These workers were then evaluated using a productivity scale, which asked eight questions about how their pain affected productivity, including whether it had caused them to reduce or modify work duties, work more slowly, take longer breaks, or need more help from coworkers. The researchers found that "on average, respondents in pain reported being impaired in three to four out of the eight productivity scale items." Finally, Wynne-Jones and colleagues interviewed 18 employees and 20 managers from private-sector companies in the United Kingdom regarding the impact of musculoskeletal pain on work productivity.[29] They found that presenteeism was prevalent, and that management support was essential to addressing productivity concerns.

Presenteeism and depression. Depressive disorders affect about 9% of the adult U.S. population annually, according to the Centers for Disease Control and Prevention (CDC).[30] There is some evidence that workers with depression are more likely to make errors and are more accident prone, probably as a result of difficulty with concentration, which is associated with depression.[31, 32]

Adler and colleagues conducted a longitudinal survey and observational study of 286 workers with depression, 93 with rheumatoid arthritis, and 193 nondepressed workers (the control group) over an 18-month period.[33] Compared with the other two groups, the depressed workers demonstrated significantly greater job performance deficits, especially with regard to mental–interpersonal tasks, time management, output tasks, and physical tasks. Kessler and colleagues surveyed 7,320 workers using the World Health Organization Health and Work Performance Questionnaire.[34] Eight percent of the respondents reported depression and a 1.5% reduction in work performance, with greater reductions seen when depression was accompanied by anxiety or fatigue and sleep problems, or both. Annual costs to employers were estimated to range from $2,550 per worker (among those with depression alone) to $10,710 per worker (among those with depression, anxiety, and fatigue or sleep problems). Lerner and Henke reviewed the literature on depression and work performance and productivity.[4] They found nine studies, conducted between 1997 and 2007, that have shown depression to be significantly associated with presenteeism. On average, depression limited "performance of physical job demands" 20% of the time and "performance of time management, mental–interpersonal demands, and output demands" 35% of the time. Estimates of total absenteeism and presenteeism costs ranged from $36.6 billion to $51.5 billion per year. Wang and colleagues conducted a telephone survey of 4,302 workers between the ages of 25 and 65 in Canada.[35] Of those with depression, 47% reported some degree of presenteeism affecting job performance. Finally, Gartner and colleagues conducted a systematic review and found 16 studies investigating how common mental disorders (including depression) in nurses and allied health professionals affect job performance.[31] There was strong evidence of a direct relationship between such disorders and increased incidence of general errors, medication errors, and near-miss errors, as well as decreased patient safety.

Although the research has provided insight into how conditions such as musculoskeletal pain and depression affect workers, there has been little research specific to nurses, and little on how nurses' presenteeism affects the quality of patient care. Our study sought to evaluate how nurses' presenteeism—specifically, that associated with musculoskeletal pain, depression, or both—influences patient safety and self-reported quality of patient care, and to consider the associated economic costs.

Hospital policies that encourage nurses not to use sick time are likely to lead to higher rates of presenteeism.

METHODS

Study design and sample. The study used a cross-sectional survey of RNs employed in hospital settings in North Carolina. To ensure representativeness, the North Carolina Board of Nursing supplied a random list of 2,500 names and addresses of RNs employed in hospital settings. A power analysis determined that a sample size of at least 200 would be sufficient to ensure at least 80% probability of detecting statistically significant partial correlations between the response and quantitative predictor variables.

After receiving institutional review board approval from the University of North Carolina at Greensboro, we mailed out 2,500 surveys starting on January 15, 2009. We mailed the surveys, instead of distributing them in the workplace, because some of the questions were about personal health and job-related quality-of-care issues; in so doing, we expected a higher response rate because the mail ensures respondents' anonymity. We also followed Dillman's strategies for improving response rates to mailed surveys.[36] Specifically, we enclosed an introductory, hand-signed letter on university letterhead describing our interdisciplinary research team and stressing the importance of the study; provided a self-addressed, stamped envelope for survey returns; and used an attractive stamp affixed at a slight angle to stimulate interest. Three weeks after the initial mailing, a follow-up postcard was sent; this included contact information, in case the original survey had been misplaced and the recipient wanted a replacement (three were requested). A one-dollar bill was provided to encourage participation. A total of 1,171 completed surveys were returned by the cut-off date of April 1, 2009 (a 47% response rate), and used for analysis. It's worth noting that 57 envelopes were returned as undeliverable, 12 respondents stated that they were no longer working in nursing, and 14 respondents indicated that they were retired but retained their licenses.

Development of the survey instrument was based on a systematic review of the literature on quality of care and the nursing workforce. Specific measures included questions on individual and workplace characteristics, quality of care, and patient safety; a numeric pain rating scale, a depression tool, and a presenteeism tool were also incorporated. The quality-of-care indicators chosen were nursing sensitive; could be self-reported; and covered quality of care, medication errors, and patient falls.

Individual and workplace characteristics included age, sex, ethnicity or race, marital status, height and weight (converted to body mass index [BMI]), total number of years worked as an RN, hours worked per day, work shift, type of unit worked, employment type (full time, part time, flex time), and highest degree attained, among others.

Musculoskeletal pain. Respondents were asked to rate the level of musculoskeletal pain experienced while at work during the previous 14 days on an 11-point numeric rating scale, with 0 representing no pain and 10 representing the most intense pain imaginable. This scale has been found to have test–retest reliability correlations (intraclass correlation coefficients) of 0.72 and 0.92 in patients with low back pain[37] and of 0.99 in patients with musculoskeletal disorders.[38]

Depression was measured by the Patient Health Questionnaire (PHQ-9), a nine-item, self-report depression assessment developed for use in primary care.[39] The nine items come directly from the nine signs and symptoms of major depression listed in the *Diagnostic and Statistical Manual of Mental Disorders*, *Fourth Edition*. The PHQ-9 is half the length of many depression measures yet has comparable sensitivity and specificity, with a reported Cronbach α of 0.89.[39] The PHQ-9 was recently used to assess levels of depression in health care workers deployed to combat settings; this tool has reportedly demonstrated 73% sensitivity, 98% specificity, and a test–retest reliability correlation of 0.84.[40] Total scores range from 0 to 27; a score of 10 or higher indicates moderate-to-severe depression.[39]

Presenteeism. Work productivity losses resulting from health problems are most often measured using self-report instruments.[41] We used a close adaptation of the Work Productivity and Activity Impairment Questionnaire: General Health (WPAI-GH). The original questionnaire (available at www.reillyassociates.net/WPAI_GH.html) includes two items asking respondents to rate the effects of health problems on work and on daily activities over the previous seven days using a numeric scale. We altered some wording slightly and asked respondents to consider the previous 14 days. Presenteeism was specifically measured with the question "How much did your physical or emotional health problems affect your productivity while you were working?"; possible responses ranged from 0 (not at all) to 10 (a great deal). The WPAI-GH has been found to correlate well with symptoms of ill health, including musculoskeletal pain and depression,[42] and this was confirmed in our analysis. However, researchers acknowledge that the WPAI-GH doesn't measure work productivity well; at best it can provide a "reasonable hypothetical measure of presenteeism."[42]

Perceived quality of care provided over the previous 14 days was measured using an 11-point numeric scale; possible responses ranged from 0 (poor) to 10 (excellent). A similar, single-item assessment of hospital-based quality of care has been used in other large studies,[43-45] with a reported Cronbach α ranging from 0.80 to 0.90.[44]

Medication errors were measured by asking "Over the past 14 days, how many medication errors did you experience?" The survey based its definition of medication error ("any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the RN") on that developed by the National Coordinating Council for Medication Error Reporting and Prevention.[46] This definition and measure have been used in initiatives aimed at asking RNs to self-report medication errors.[47]

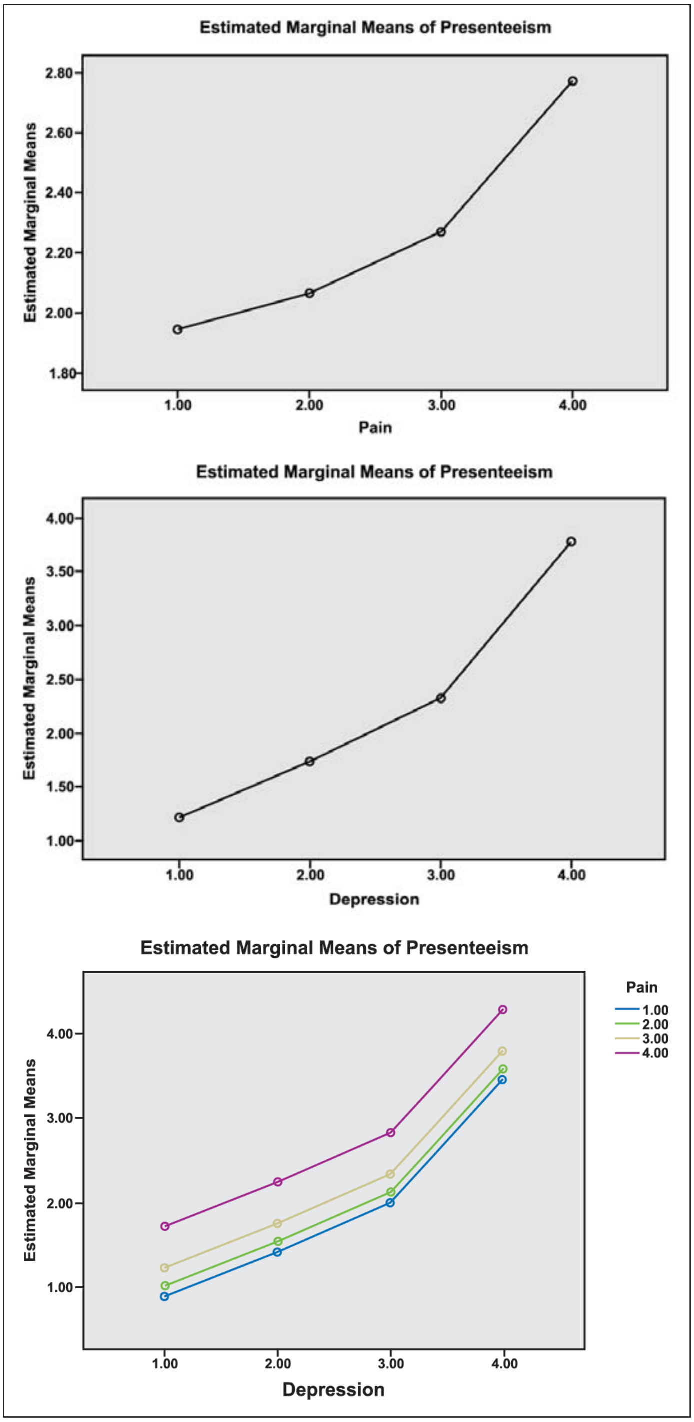
Nurse presenteeism in hospitals is raising health care costs.

Patient falls were measured by asking "Over the past 14 days, how many patient falls occurred under your care?" The survey used the definition of a patient fall employed in the National Database of Nursing Quality Indicators: "an unplanned descent to the floor during the course of [the patient's] hospital stay."[48]

RESULTS

Participant characteristics. The majority of respondents were female (91%), married (73%), and white (85%). Ages ranged from 21 to 72 years (mean, 45 years). Respondents reported having worked as nurses from one to 50 years (mean, 17 years). The majority (76%) worked full time; of these, 18% worked in

Figure 1. Relationship of Presenteeism to Pain and Depression



Note: In each of the three graphs, the y-axis represents the marginal means—the mean presenteeism scores for each of the four categories 1, 2, 3, and 4. The x-axis in the first graph represents the four pain categories; in the second graph, it represents the four depression categories. The third graph depicts mean presenteeism scores for various category combinations of pain and depression. For example, the bottom line shows how the mean presenteeism score changes when pain is in category 1 and depression changes from category 1 to category 4.

critical care, 11% worked on medical–surgical units, and 12% worked on maternal–child units. The average number of hours worked in the previous 14 days was 65 (range, 0 to 126 hours).

Participant responses. Seventy-one percent reported having had musculoskeletal pain at work (as indicated by a pain score greater than 0). On a scale of 0 (no pain) to 10 (most intense pain), the mean score was 2.47; but 18% of respondents reported a score greater than 5. The prevalence of depression (as signified by a total score of 10 or more on the PHQ-9) was 18%. Two percent of nurses reported missing more than 14 hours of work during the previous two weeks because of a health problem. The majority of respondents (62%) reported a presenteeism score of at least 1 (equivalent to 10% impairment).

Asked to rate the quality of care they had provided over the previous 14 days on a scale of 0 (poor) to 10 (excellent), respondents reported an average quality-of-care score of 8.4. Three percent of respondents reported that a patient under their care had fallen during the previous 14 days, and 6% had made at least one medication error in the previous 14 days. Interestingly, 88% said they always reported their own medication errors, but when respondents were asked “What percentage of the time do you feel your coworkers accurately report errors?” the mean answer was 74%.

To determine how musculoskeletal pain and depression affect presenteeism, we converted both pain and depression into categorical variables. Pain scores ranged from 0 to 10, and depression scores ranged from 0 to 26. These scores were split into four categories based on a quartile split, whereby the data are partitioned into four groups with about 25% of the data in each group. The quartile splits for pain were 0, 1 or 2, 3 or 4, and 5 and above; those for depression were 0 or 1, 2 or 3, 4 to 7, and 8 and above. The labels 1, 2, 3, and 4 were then used to represent the four groups in each case. After controlling for age, years worked as an RN, BMI, hours worked per day, work shift, highest degree attained, and employment type, we found that both pain and depression were each significantly associated with presenteeism ($P < 0.001$). There was no evidence of an interaction between pain and depression. (See Figure 1.)

To determine how presenteeism was related to patient falls, we used a Poisson regression model to predict the average number of patient falls corresponding to various predictor values. After controlling for all of the variables noted above, presenteeism was found to be significantly associated with patient falls ($P = 0.004$; β coefficient = 0.1680). Based on this model, for each unit increment in the presenteeism score, the number of patient falls is expected to increase by 18%.

To determine how presenteeism was related to medication errors, we also used a Poisson regression model. Again, after controlling for all of the aforementioned variables, presenteeism was found to be significantly associated with the number of medication errors ($P = 0.0001$; β coefficient = 0.1655). Therefore, for each unit increment in the presenteeism score, the number of medication errors is expected to increase by 18%.

After controlling for all of the variables noted above, presenteeism was found to be significantly associated with the self-reported quality-of-care score ($P < 0.001$; β coefficient = –0.150). For each unit increment in the presenteeism score, the quality-of-care score decreased by an average of 0.15 points. Therefore, presenteeism was significantly associated with patient falls, medication errors, and overall self-reported quality of care.

Costs. We next estimated the costs of presenteeism in North Carolina RNs working in hospitals. The sample average of the presenteeism score was 1.6317 (on the 0-to-10 scale) in our data, so the elimination of presenteeism would be associated with a reduction of this amount. In North Carolina in 2008, according to data obtained from the North Carolina Board of Nursing, 61,153 RNs worked in general medical and surgical hospitals, with average annual earnings of $61,347. In 2008 nonwage compensation (including paid leave, supplemental pay, insurance, and retirement) for civilian workers averaged 43.25% of annual earnings.[49] Based on RNs' average annual earnings, this amount would be $26,533, yielding an average total annual compensation of $87,880.

Our first estimate of the cost of presenteeism was based on responses to the question assessing presenteeism, described above. In our calculations, each unit increment represented a 10% point reduction in productivity (for example, a 2 corresponded to a 20% decrease in productivity). The mean score on this question (1.6317) therefore implies a productivity reduction of about 16.3% as a result of presenteeism. At an average annual compensation of $87,880, this corresponds to a productivity loss of $14,439 per nurse and $876.9 million for the state. In 2008 there were 2.6 million RNs working in the United States[50]; thus, extrapolating these numbers to the nation yields an estimated productivity loss of $37.3 billion annually.

Our second estimate was obtained using responses to the question asking "How would you rate the quality of care you were able to provide your patients over the last 14 days?" Answers ranged from 0 (poor) to 10 (excellent). As noted above, for each unit increment in the presenteeism score, the self-reported quality-of-care score went down by an average of 0.15 points. To determine the predicted improvements in quality of care if presenteeism were eliminated, we multiplied that value (0.15) by the mean presenteeism score (1.6317). We found that quality of care was predicted to improve by 0.245 points, representing a gain of 2.93%. If the resulting cost savings were proportionate to total compensation, this would correspond to a cost reduction of almost $2,575 per North Carolina RN and an aggregate savings of $157.5 million for the state annually. Extrapolating these numbers to the nation, the predicted cost savings would be over $6.7 billion for the United States annually.

Our final estimates concerned the relationship between presenteeism and two nursing-sensitive measures: patient falls and medication errors. The first step involved estimating the costs resulting from these adverse events. In estimating costs related to falls, we based our calculations on the work of Bates and colleagues and Haines and colleagues[51, 52]; both studies referred to hospitalization costs only and didn't consider other medical expenses or costs associated with poor health. In estimating the costs related to medication errors, we based our calculations on the work of Karnon and colleagues[53, 54]; the later study included hospitalization costs and reductions in quality-adjusted life-years. We then converted costs calculated for earlier years to 2009 dollars by assuming a 3.75% annual rate of inflation. This resulted in baseline estimates of expected costs per fall and per medication error of $583 and $1,851, respectively.

Next, we calculated the anticipated change in the incidence of these events if presenteeism were eliminated. A direct measure of the predicted reduction was first obtained using the Poisson regression model. For each unit increment in the presenteeism score, falls increased by 0.168; a 1.6317-unit decrease in the presenteeism score reduced the predicted number of falls by 24%. For each unit increment in the presenteeism score, medication errors increased by 0.1613; a 1.6317-unit decrease in the presenteeism score reduced the predicted number of medication errors by 23.1%. For the 14-day period covered by the survey, the mean numbers of falls and medication errors reported were 0.0415 and 0.0764, respectively, which convert to 1.079 falls and 1.986 medication errors per RN annually. Reductions of 24% and 23.1% would imply respective decreases of 0.259 falls and 0.459 medication errors per RN annually.

It's important to note that respondents' estimates for how often they reported these adverse events may have been understated. To correct for this, we adjusted the figures using the respondents' estimate for the percentage of time that they felt their coworkers accurately reported medication errors. Since the mean response regarding coworker reporting was 74.42%, we adjusted our estimates upward by a factor of 1.3437. Based on the corrected values, we'd expect the elimination of presenteeism to decrease falls and medication errors by 0.348 and 0.618, respectively, per RN annually.

These reductions can then be multiplied by the baseline and upper-boundary estimates of the associated expenses to obtain estimates of the presenteeism costs per nurse. The increased falls and medication errors caused by presenteeism are expected to cost $1,346 per North Carolina RN annually, and if nursing demographics for North Carolina are similar to those for the nation, just under $2 billion for the country (see Tables 1 and 2).

DISCUSSION

In this sample, 71% of RNs employed in North Carolina hospitals reported working with some musculoskeletal pain, with 18% reporting pain levels greater than 5 (on an 11-point scale). That first percentage is higher than many previously reported in the literature. As discussed earlier, studies have found that from 17% to 89% of nurses have reported experiencing a musculoskeletal disorder or pain or both.[18-20] The proportion of RNs reporting recent musculoskeletal pain in our study was much higher than that of middle-aged workers in a national population study, in which 15% reported recent pain (specifically back pain).[25]

We were surprised to find that 18% of RNs in our study reported depression. This is a much higher prevalence rate than the 9% national prevalence cited by the CDC,[30] although it's lower than the 35% prevalence found in a study conducted among medical–surgical nurses.[55] It's important to note that depression is more prevalent in women than in men, and most of our survey respondents were women. Furthermore, hospital nursing is known to be highly stressful, and there is some evidence that job stress increases one's risk of depression.[21, 56] Nevertheless, the high rate of depression among nurses is a cause for concern.

Our findings indicate that musculoskeletal pain and depression are among the major causes of nurses' presenteeism. Our findings also support research that has identified pain and depression as significant contributors to decreased work productivity.[4, 5, 25, 33, 57-60] However, at present, many hospitals encourage nurses not to use sick time and penalize them for absenteeism. For instance, some hospitals offer quarterly bonuses for unused sick time and take absenteeism rates into account in annual performance evaluations. Such policies are likely to lead to higher rates of presenteeism.

The effects of nurses' health on productivity may become an even greater concern as the nursing workforce ages. In 2000 a large retrospective cohort analysis led researchers to predict that by 2010, the average age of an RN would reach 45 years, with 40% of the nursing workforce older than 50 years.[61] Indeed, according to the most recent National Sample Survey of Registered Nurses, by 2008 the average age of all employed nurses had reached 45.5 years.[62] Buerhaus and Auerbach used data from the Current Population Survey to determine the impact of the recent recession on nurse employment in hospitals.[63] They calculated that in 2010, nurses over age 50 represented 34% of the full-time hospital-employed nursing workforce and accounted for about 60% of the total increase in that workforce over the last decade.

Another concern has to do with possible adverse effects of medications that nurses might be taking to control their symptoms. Although our study didn't assess medication use, it's known that some antidepressants can cause dizziness when a person changes position and that narcotic analgesics often cause drowsiness and impaired judgment.

Our most significant finding was that nurse presenteeism was significantly associated with nursing-sensitive quality-of-care indicators. Specifically, presenteeism was associated with an increase in medication errors and patient falls, and with lower self-reported quality of care. In part prompted by efforts to improve patient safety, there has been more research into nursing-sensitive quality-of-care indicators. Needleman and colleagues considered a range of factors believed to influence nursing performance and determined that they fall into four broad categories: "nurse training and competencies, physical plant and structure, nursing organization, and work environment and culture."[64] Our study points to a fifth category, nurses' health: it demonstrates that nurses' health affects work productivity, which in turn affects quality of care.

Clearly, then, keeping RNs healthy and addressing presenteeism should be priorities. The reporting of measures of staff health and well-being could

Table 1. Estimated Annual Costs of Presenteeism, North Carolina

Basis for cost estimates	Cost/RN	Total cost in NC (millions of dollars)
Decreased productivity	$14,439	$876.9
Decreased quality of care	$2,575	$157.5
Increased patient falls and medication errors		
Baseline	$1,346	$82.3
Upper boundary	$9,067	$554.5

Table 2. Estimated Annual Costs of Presenteeism, United States

Basis for cost estimates	Cost/RN	Total cost in U.S. (millions of dollars)
Decreased productivity	$15,541	$22,667
Decreased quality of care	$2,791	$4,070
Increased patient falls and medication errors		
Baseline	$1,346	$1,964
Upper boundary	$9,067	$13,244

be used as part of performance monitoring. More "open" institutional policies regarding the declaration of health problems and any associated limitations might make it easier for nurses to get needed help.[26] Work-focused interventions that are geared toward early recognition and treatment of pain and depression in nurses are probably called for. Other strategies for addressing presenteeism might include contracting with disability specialists, who can help employees with chronic injuries or illnesses to modify their work techniques; teaching first-line managers about employee assistance programs and other health resources; and establishing safe-lifting programs.

Finally, our calculations indicate that nurse presenteeism in hospitals is raising health care costs, with estimated U.S. costs of about $2 billion dollars annually from increased falls and medication errors alone. The actual amount may be much higher. First, fall-related expenses were calculated on the basis of only hospital costs; other medical expenses or reductions in the quality of patients' lives weren't taken into account. Second, although we assumed that our respondents reported the number of falls and of medication errors accurately, underreporting is likely. In a recent literature review, Brady and colleagues cited one study's finding that 50% of nurses didn't report medication errors because of fear of repercussions, and another study's finding that nurses reported only 47% of such errors.[65] Although it may be impossible to eliminate all costs associated with nurse presenteeism, well-designed efforts to support nurses with chronic health problems are likely to lead to substantial cost savings.

Limitations include our study's use of a one-state sample and our study's cross-sectional design. Additional studies involving more participants and sampling a national population are needed. (It's worth noting that the demographic characteristics of our respondents are similar to those of the national nursing workforce.) Another limitation of this study was its use of self-reporting, which isn't always reliable, although the anonymous data collection method probably afforded more accurate responses to sensitive questions about personal health, job performance, and patient safety. We anticipate that follow-up studies will ask for more information about nurses' health problems and will employ additional measures of quality of care.

CONCLUSIONS

This study supports a growing body of literature emphasizing the importance of an adequate, productive nursing workforce to the delivery of high-quality, cost-effective health care. Its findings also uniquely suggest that musculoskeletal pain and depression affect nurses' productivity, which in turn affects quality of care and patient safety. In an age when it's imperative that all possible avenues for improving the quality of care and decreasing health care costs be explored, nurses' presenteeism is one area that has been overlooked. We hope that the findings of this study prompt further investigation. ▼

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