Differences in health, productivity and quality of care in younger and older nurses

By: Susan Letvak, Christopher Ruhm, Sat Gupta

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Abstract:

Aim To determine if younger and older hospital employed nurses have differences in their self-reported health, health related productivity and quality of care.
Background An understanding of age cohort differences may assist nurse managers in understanding the health related productivity and potential quality of care concerns of their staff.
Method A cross-sectional survey design was utilised. There were 1171 usable surveys returned (47% response rate). Nurses over the age of 50 made up 26% of the respondents.
Result Older nurses had a higher body mass index (BMI), higher mental well-being, higher pain scores, a 12% higher prevalence of having health problems, and reported a higher health related productivity loss than younger nurses.
Implications for nursing management Nurse managers must determine if their older nurses are being given more difficult, complex patients because of their experience. Perhaps older nurses, especially those with health problems, need assignments that require their assessment and critical thinking skills rather than their strength and physical abilities.

Keywords: generational differences | presenteeism | quality of care

Article:

Introduction

The profession of nursing is committed to providing the safest and highest quality of health care to patients. Two landmark reports issued from the Institute of Medicine (IOM): To Err is Human and Crossing the Quality Chasm exposed serious gaps in the US healthcare system's ability to deliver safe and efficient patient care. The most significant concerns about patient safety specific to nursing care occur in the hospital setting (Blegen 2006). Nurses are the principal caregivers in

hospitals and are crucial for providing high quality care (National Quality Forum 2005, Hedrich et al. 1997).

There is little doubt that a high quality of care is dependent on an adequate supply of productive, experienced nurses. A meta-synthesis of 94 research studies prepared for the Agency for Health Research and Quality (AHRQ) demonstrates that a productive nursing workforce is vital to quality health care (Kane et al. 2012). The recent economic recession in the United States (USA) has led to an unprecedented increase in hospital employed nurses; importantly, more than half of these nurses are over age 50 (Buerhaus et al. 2009). There has been much written about the ageing of the nursing workforce in the literature. The last U.S. nursing workforce survey reported the average age of a registered nurse (RN) to be 47 years; and nearly 45% of RNs were 50 years of age or older, an increase from 33% in 2000 and 25% in 1980 (U.S. Department of Health and Human Services, Health Resources and Services Administration 2010). Additionally, while there was a 62% increase in younger nurses aged 23–26 years entering the workforce between 2002–2009 (Auerbach et al. 2011), an increase in accelerated programmes for second career students in the USA is leading to graduates who are older at the start of their career (Auerbach et al. 2011). Importantly, the ageing of the workforce is of international concern. The average age of a RN in Canada is currently 45 years (Canadian Institute for Health Information 2010) and the World Health Organization/Europe (2008) reports that the average age of nurses in Denmark, France, Iceland, Norway and Sweden is 41–45 years.

An ageing nursing workforce has implications for the profession, as health problems are known to increase as people age (Keller & Burns 2007). Weight gain often occurs as people age, and being over-weight or obese is known to contribute to chronic illness. A decrease in aerobic power, reaction time, speed and acuity of senses are also known to decrease as we age (Watson 2010). While there is considerable variability in individuals' age related changes, older workers have been found to require more time for recovery after work (Kiss et al. 2010) and ageing may pose safety risks in those environments designed for younger, 'average' employees (Hansson et al. 2007, Gabrielle et al. 2006). Older shift workers have also been found to have more pronounced health problems than younger shift workers (Costa & Sartori 2005). Importantly, research has found that both age and health impact on the productivity of hospital employed nurses (Letvak & Buck 2001, Letvak et al. 2008).

Like other professions, nursing now has four generations of workers who work side by side. There has been a lot written about generational differences between older and younger workers. In general, older workers are said to be loyal, hard-working, more resistant to change and are challenged by technology; while younger workers seek a balance between work and leisure, expect prompt feedback, are highly independent and more 'tech-savvy' (Twenge et al. 2009). While some research has been done on the differences between younger and older nurses, little research has directly addressed the differences between health, productivity and quality of care in younger and older nurses. Thus, the purpose of this study was to determine if younger and older hospital employed nurses have differences in their self-reported health, health related productivity, perceived quality of care, medication errors and patient falls.

Review of Literature

Most nursing workforce studies include nurses of all ages. The longitudinal Nurses' Health Study (NHS) began following a convenience sample of U.S. nurses in 1976. Importantly, nurses were chosen as participants not because they are nurses, but because nurses were known to respond to surveys accurately and would understand more technical health information measures (Channing Laboratory). The majority of published studies do not allude to nurses in their titles or discussion. However, two published studies addressed the effect of long time shift work on health. Schernhammer et al. (2005) looked at the effect of rotating shifts on cancer occurrence. In their sample of 53487 women they found that women who had worked 20 years or more on rotating shifts had a significantly higher risk for endometrial cancer. Feskanich et al. (2009) studied the same cohort of nurses and found in the sample of 53487 women that those with 20 years or more of rotating shifts had a significantly higher risk for wrist and hip fractures.

Very few studies have been designed specifically to address differences between younger and older nurses. Mion et al. (2008) conducted focus groups with older nurses (aged 46–73) and younger nurses (aged 22–29 years) to determine their perceptions and thoughts on the work environment. The researchers found younger and older nurses described similar concerns; both groups valued the experience of older nurses, thought new roles should be developed for ageing nurses, and suggested needed system changes to retain older nurses (i.e. shifts shorter than 12 hours). Both groups also described generational differences, including older nurses being more committed to the unit's needs and accepting of organisational change, while younger nurses were concerned about the decreasing physical capabilities of older nurses and the 'perks' they received (i.e. better work schedules).

Kovner et al. (2007) conducted a study to determine the differences in attitudes toward work between older and younger RNs in 29 U.S. states. Older RNs were identified as being over the age of 50 years. Surveys were received from 1906 RNs (48% response rate). There were significant differences in attitudes toward work between older and younger nurses, with older RNs reporting less family–work conflict and more work motivation than younger RNs. Older RNs reported that it was more difficult to find another job and there were fewer promotional opportunities than younger RNs. Additionally older RNs were more satisfied, had greater organisational commitment, reported more distributive justice cohesion, more supervisory support, and less organisational constraint and quantitative workload than younger RNs. There were no significant differences between older and younger RNs for autonomy, mentor support or the degree to which job performance is repetitive.

Finally, one study was found that compared the health of 'pre-registered nurses' (students) with 'registered nurses' at one university hospital in the United Kingdom (Malik et al. 2003). While the mean age of the 876 respondents was 35 years (range 17–67 years), the mean age of each group was not provided. Almost half of the respondents did not meet recommended levels of physical activity, two-thirds did not consume the daily requirement of fruits and vegetables, and almost half ate too much food high in fat and sugar. With the exception of smoking behaviour, registered nurses had healthier lifestyle behaviours than the 'pre' registered nurses did.

While there has been some research conducted comparing older and younger nurses, no research was found that specifically compared the self-reported health, health related productivity, perceived quality of care, medication errors and patient falls in hospital employed nurses. An

understanding of age cohort differences may assist nurse managers in understanding the health related productivity and potential quality of care concerns of their staff.

The Study

This was a cross-sectional survey design of RNs employed in hospitals in North Carolina (NC), USA. To ensure representativeness, the NC Board of Nursing was able to supply a random list of 2500 names and addresses. We used Dillman et al. (2007) strategy for mailed surveys. After receiving Institutional Board Approval, we mailed survey packets that included an introductory letter, a return addressed stamped envelope and a one dollar bill to encourage participation. Several weeks later a follow-up, reminder postcard was sent. A total of 1256 surveys were returned and 1171 met inclusion criteria (i.e. some respondents were retired or no longer worked in a hospital setting) and were used for analysis for a response rate of 47%. Nurses over the age of 50 made up 26% of the respondents.

Measurement

The survey instrument was developed from a review of national reports on quality of patient care and the nursing workforce, and a systematic review of the quality of care and workforce literature.

Demographic and workplace measures

Individual variables included age, sex, ethnicity/race and marital status. Workplace variables included hours worked per day/week, usual shift(s) worked, type of unit worked on, number of years worked as a RN and weekly/yearly salary. Older was defined as being older than 50 years which is consistent with other nursing studies that have compared younger and older nurses (Norman et al. 2006, Kovner et al. 2007). Younger nurses were those aged 49 years and younger.

Self-reported health measures

Health variables included height and weight [calculated as Body Mass Index (BMI)], a perceived overall rating of health, cigarette and seat belt usage, reporting of specific health problems, a musculoskeletal pain scale and a depression scale. Specifically, perceived overall health was measured on an 11-point Likert scale with 0 being poor and 10 being excellent. Participants were asked to check if they had health problems from a listing of common health problems that impact work productivity, such as allergies, anxiety, hypertension/heart disease or stomach issues. Participants were asked to rate their level of musculoskeletal pain while at work over the past 14 days on an 11-point scale with 0 meaning no pain and 10 being the worst pain imaginable. This scale has been found to have test–retest reliabilities (intra-class correlation coefficients) of 0.72 and 0.92 in patients with low back pain (Childs et al. 2012) and 0.99 in patients with musculoskeletal disorders (Gallasch & Alexandre 2008). The Patient Health Questionnaire (PHQ-9) was used to measure depression. The PHQ-9 is half the length of many depression measures yet has comparable sensitivity and specificity, with a reported Cronbach's alpha of 0.89 (Kroenke et al. 2004) and has been used to assess levels of depression in health-care workers

(Grieger et al. 2010). Scores ranged from 0 to 27 and the cut-off score for clinical depression is 10 (Kroenke et al. 2004).

Health related productivity measure

Health related productivity (known as presenteeism was measured using the Work Productivity and Activity Impairment Questionnaire: General Health (WPAI-GH) (Reilly 2005). The GPAI-GH utilises a Likert scale of 0–10, with 0 representing health problems having no effect on work and 10 being health problems completely prevented my work over the past 14 days. Researchers have found that the WPAI-GH presenteeism measure correlates well with symptoms of ill health (Loeppke et al. 2012).

Quality of care measures

Quality of care measures included perceived quality of care score and patient safety measures of medication errors and patient falls. Quality of care provided over the past 14 days was measured on an 11-point Likert scale from 0 (poor) to 10 (excellent). A single item indicator has been used in other large studies of hospital based quality of care (Aiken et al. 2002, Ulrich et al. 2010, Schmalenberg & Kramer 2004), with reported Cronbach's alphas ranging from 0.80 to 0.90 (Kramer & Schmalenberg 2007, Schmalenberg & Kramer 2004). Medication errors were measured by asking how many medication errors were made by the participant over the past 14 days. The survey used the U.S. National Coordinating Council for Medication Error and Prevention definition as ‘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’. Patient falls were measured by asking the number of patient falls that had occurred to the RNs’ patients over the past 14 days. The survey used the U.S. National Database of Nursing Quality (2006) definition of a patient fall as ‘an unplanned descent to the floor during the course of a patient's hospital stay’.

Data analysis and findings

Data were entered and analysed utilising spss for Windows version 19.0 (SPSS Inc., Chicago, IL, USA). Comparison of the two age groups of nurses (with 50 years as the cut-off age) was done using a two-sample t-test relative to various measures. Statistically significant differences ($P < 0.05$) were noticed in several cases, near significant ($0.05 < P < 0.10$) differences were noticed in two cases, and no significant difference ($P > 0.10$) were noticed in several cases. In the case of significant or near significant differences, reported values of P are one-sided. In the case of no-significant difference, reported values of P are two-sided.

The study participants were 91% female; 85% were White/Non-Hispanic and 73% were married which is similar to national demographic data of the nursing workforce. The majority worked full time (76%) on 12 hour shifts (84%). There were significant differences in the length of tour worked between the groups with 60% of younger nurses working 12 hour shifts and only 38% of older nurses working 12 hour shifts ($P = 0.002$). Older nurses made on average $10697 more in yearly salary ($P = 0.000$), worked an average of 1.29 hours more per week ($P = 0.002$), had a higher average BMI of 1.94 ($P = 0.000$), better mental well-being by an average of 0.466 ($P =$

0.000), missed an average of 1.5 hours per 2 weeks due to vacation (P = 0.014), higher average productivity loss of 0.20 (almost significant P = 0.055), had an average of 0.5 more health problems (P = 0.000), had an higher average pain level by an amount 0.5 (P = 0.000) and a 12% higher prevalence of health problems (P = 0.000). The variable 'patient falls' was highly skewed, so we did group comparison for this variable using a two-sample Wilcoxon rank sum test as well. The one-sided value of P was 0.025, again indicating a significantly higher rate of patient falls for older nurses at an average of 0.29 more falls per 2 weeks (see Table 1).

Table 1. Differences between younger and older nurses

Variable	Younger nurses mean and (SD)	Older nurses mean and (SD)	One-sided *P* value
Yearly salary	$59127 ($25557)	$69824 ($26585)	0.000
Hours worked/week	35.5 (9.58)	36.8 (10.22)	0.002
BMI	26.5 (5.49)	28.5 (6.50)	0.000
Mental well-being	7.7 (1.93)	8.1 (1.99)	0.000
Hours missed due to Vacation	4.09 (10.48)	5.60 (11.72)	0.014
Health related productivity loss	1.72 (2.19)	1.51 (1.98)	0.055
Number of health problems	1.70 (1.67)	2.20 (1.71)	0.000
Prevalence of one or more health problems	74% (3.0%)	86% (3.2%)	0.000
Patient falls	0.03 (0.24)	0.06 (0.32)	0.058 0.025[a]
Pain level	2.26 (2.26)	2.76 (2.38)	0.000
Quality care	8.33 (1.57)	8.40 (1.73)	0.455
Total depression	5.47 (4.98)	5.03 (5.03)	0.145

P < 0.05 (significant).
0.05 < *P* < 0.10 (near significant).
P > 0.10 (not significant).
[a] *P* value based on Wilcoxon rank sum test (non-parametric test).

No significant differences were observed between the groups in terms of medication errors per 2 weeks (two-sided *P* = 0.179), total depression (two-sided *P* = 0.145), prevalence of depression (total depression greater than 10, *P* = 0.2000), quality of care (*P* = 0.455), satisfac-tion (*P* = 0.175), smoking prevalence (*P* = 0.434), prevalence of seat belt use (*P* = 0.202), physical well-being (*P* = 0.183), or hours missed per 2 weeks due to health problems (*P* = 0.377) (see Table 1).

Discussion

Previous research has shown that nurses with over 20 years of experience who rotated shifts had a higher risk for endometrial cancer and hip and wrist fractures (Schernhammer et al. 2005, Feskanich et al. 2009). Studies comparing older and younger nurses have found that older nurses were more committed to their units and accepting of change, had less family–work conflict, and higher job satisfaction more work motivation, but felt there were few promotional opportunities. Younger nurses were concerned about decreasing the physical abilities of older nurses and the higher salaries and better work hours of older nurses. This study uniquely documents differences between older and younger nurses in terms of not only work related and health measures, but also their health related productivity and quality of care. An advantage of our study is that by looking at nurses in one state we have a more homogeneous sample and so there are less likely to be confounding inter-state differences that could be correlated with nurse age.

In terms of work related differences, it is not surprising that older nurses made significantly more money than younger nurses. Data from the 2010 census confirm that peak income occurs between the ages 45–54 and then only slightly decreases between ages 55–64 years (U.S. Census Bureau 2006). Occupational wage analyses demonstrate that nurse wages have increased markedly over time and are well above the wages received by other college educated women (Hirsch & Schumaker 2008). However, what is not included in these national salary analyses is the fact that nurses are required to work weekends, holidays and non-standard shifts. Additionally, a salary gap of just over $10000 per year between groups is not large and points to a glass ceiling that exists for hospital employed nurses. Older nurses were also more likely to work 8 hour vs. 12 hour shifts. While younger nurses may prefer longer shifts with more days off per week, nurse managers need to try to offer flexible schedule options for all nurses. Additionally, while older nurses did have higher salaries than younger nurses, the difference was not great. Nurses, and nurse managers, must continue to advocate for salaries reflective of a nurse's years of employment if we are going to retain our older, more experienced nurses.

In terms of differences in health and health related productivity, there were significant differences between younger nurses and older nurses. Specifically, the older nurses had higher mental well-being, a higher BMI, a higher average pain level, a 12% higher prevalence of having health problems, and reported a higher health related productivity loss than younger nurses. While there were no significant differences in depression scores, higher mental well-being scores may be due to older workers having less family–work conflicts as described by Kovner et al. (2007). The higher BMI scores in older respondents was not surprising as Centers for Disease Control national statistics document that BMI increases as people age (2011). The nurses in this study had an average BMI of 27.28 (SD = 5.97) which was exactly the same as the average BMI in a national sample of 760 registered nurses (Miller et al. 2011). There are many health related consequences that are linked to being over-weight or obese, especially as people age. Goetzel et al. (2007) report that obesity can decrease worker productivity by as much as 10–12%. The older nurses in this study also had a higher BMI and lower worker productivity scores. To assist nurses with maintaining a healthy weight, nurse managers can organise weight watcher groups within the hospital or unit, promote healthy meal options for celebrations and when ordering in food, and provide schedules that are conducive to proper rest and exercise programmes. Managers can also advocate for health wellness programmes for employees who work in hospitals.

The older nurses in this study had higher levels of pain, more health problems and more health related productivity loss than younger nurses. It is known that health problems and musculoskeletal pain occur at higher rates as people age (CDC 2012). Research on hospital employed nurses has found that having pain and health problems impact on the productivity of nurses (Letvak & Buck 2001, Letvak et al. 2008). In a synthesis of the literature, Tomey (2012) found that organisations with unhealthy work forces have a high cost burden from higher rates of absenteeism, presenteeism and loss of productivity. Nurse managers are pressured to decrease costs while promoting the highest quality of care. Health related productivity loss is an area that is not easily recognised and must be considered within hospital systems. Managers can share this information with hospital administrators when advocating for resources to support healthy work environments for their staff.

In terms of quality of care, there were no differences in the number of medication errors made between younger and older nurses. However, older nurses did have higher rates of patient falls (0.29 more falls every 2 weeks). While this cross-sectional, correlational design does not allow for 'cause and effect' assumptions, it is possible that the older nurses in this study, who also had more years of experience, were able to compensate for their health problems when performing mental tasks, such as medication administration, but not with more physically demanding physical tasks, such as rescuing a patient from a fall. However, as hospitals lose reimbursement for hospital associated incidents, including patient falls, it may be that safety could be enhanced by assigning patients at high risk for falls to nurses without known health problems, since these nurses may be more challenged in providing spontaneous, heavy physical care.

Finally, presenteeism was documented in this sample of nurses. While absenteeism represents unscheduled time away from work, presenteeism is defined as reduced on-the-job productivity due to health problems (Schultz et al. 2007). Despite higher levels of pain, more health problems and decreased productivity, the older nurses in this study did not have a higher rate of absenteeism than younger nurses and even worked more hours per week. These nurses are present at work, yet may not be fully meeting the demands of the job. Nurse managers can decrease the impact of decreased productivity and health related quality of care concerns by recognising presenteeism in their staff. Nurses who exhibit health problems that may be impacting their performance can be referred to Human Resources for appropriate referrals and counselling. Managers can work to assure that their units are adequately staffed and safe handling equipment is readily available for nurses. Managers need to be aware of institutional and federal policies concerning worker health so they can provide appropriate counsel. Nurse managers must also determine if their older nurses are being given more difficult, complex patients because of their experience. Perhaps older nurses, especially those with health problems, need assignments that require their assessment and critical thinking skills rather than their strength and physical abilities.

Limitations and recommendations for future research

While the demographics of our study population are similar to the demographics of the U.S. nursing workforce, a limitation was the use of a one-state sample. Additional limitations include the use of a cross-sectional design and self-reported measures. International research is needed with larger sample sizes to provide more information on how the ageing of the nursing workforce and nurse health impacts the quality of care. Additionally, there is a critical need for research based interventions that will protect the health and safety of the nursing workforce as well as evidence-based strategies that will assist nurses who have health problems with maintaining their productivity and the highest quality of patient care.

Conclusion

Despite the recent abatement of a nursing shortage, it is predicted that more than 100 000 nurses will leave the workforce by 2015 as the economy improves (Staiger et al. 2009). A return of the nursing shortage, in combination with an ageing workforce, will place more demands on nurse managers to assure that the highest quality of care is provided by nursing staff who are

productive and healthy enough to provide that care. This study documents that older nurses are more challenged by health problems than younger nurses, and these health problems are leading to lower productivity and potential patient safety concerns, specifically, patient falls.

While managers must strive to provide working conditions that are conducive to both nurse and patient safety, nurses themselves must also be aware that their health problems may be impacting on the care they are providing. Nurses need to remember that in addition to caring for their patients, they must also care for themselves. Younger nurses need to be aware that their lifestyle choices of today will impact their health and ability to practise nursing as they age. Finally, as ageing and health concerns of the workforce are likely to accelerate, the profession of nursing must ask, do we need our older, most experienced nurses for their physical brawn, or for the clinical expertise and caring they bring to the bedside?

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Ethical approval

Ethical approval was obtained from the UNC Greensboro approval: Study #: 08-0078.

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