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A health comparison of Alabama nurses versus US, UK, and Canadian normative populations

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KEYWORDS

Nursing;
Health;
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Population;
Comparison

Summary This article is one of a two part series examining the people and environment associated with patient handling. The approach used was that of an occupational injury investigation of a job class, which incorporates defining in the task, environment, tools, and worker health status. Hence, the objective of this portion of the research was to develop a method and use it to compare the physical and mental health of Alabama nurses with known normative populations to determine a baseline of overall health. For this purpose, the validated SF-36[®] survey was used to collect data on Alabama nurses who had been registered in the state for at least one year. The potential participant pool included 1000 nurses randomly selected from more than 49,000 registered. Physical mailers with a pre-paid return envelope and a follow-up reminder post-card were used. A return rate of 10% was expected based on nursing literature. One hundred and one surveys were returned with 87 being complete. Results confirmed that nursing in the US is a female dominated profession with the survey matching both the Alabama and US national average of 92%. Comparisons of the sample data to general populations yielded significant differences in 3 of the 8 outcome measures: social functioning; physical functioning; bodily pain. In each of these measures, Alabama nurses had a reduced health status compared to at least one comparative population. Additionally, data related to body mass index (BMI) for Alabama nurses were stratified by gender and age. Results indicated 28% had a "healthy" BMI with 37% and 35% of the nurses being "overweight" or "obese", respectively. Consequently, results suggest Alabama nurses have a reduced health status compared to normative populations and show similar

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but not identical BMI trends to the general populations for the state of Alabama and the US, which warrants concerns about potential declines in health status among caregivers.

Significance to healthcare: Nurses constitute the largest proportion of the healthcare industry's workforce. Understanding the perceptions of health status of this employee group is essential to gain further information about possible influences of health on nurses' ability to continue to perform their jobs.

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Editor's comments

This is the first of two articles looking at patient handling and its relationship to the health of nursing staff. Whilst not an enormous sample size this study does suggest there are a number of facets to consider that relate to the physical and mental health of nurses. Some interesting points are raised for the reader to consider, with some areas likely to stimulate debate between health care professionals asking, 'where do we go from here?'

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Introduction

The worldwide demand for healthcare workers, especially nurses, is becoming critical as general populations increase, causing a greater demand for healthcare services. In the 2002, the US Census Bureau projected that those age 65 years and older would comprise an estimated 13.42% of the US population in 2010. This projection also estimated that those 55 years and older would constitute 25.04% of the population, which represents in 16.69% increase in this segment of the population over 10 years (US Census Bureau, 2002; CDC, 2004). With this increase in age, the inevitability of declining health is accompanied by an increased need for healthcare, which highlights an equally important factor. It is estimated that one half of the current US nursing population is expected to retire in the next ten years (Berliner and Ginzberg, 2002; Buerhaus et al., 2003). However, this growing burden created from retirement, population growth, and nursing shortages are not just a US problem, but also an international one, causing great concern over the ability of global healthcare to meet the demands for future services (Berliner and Ginzberg, 2002; Holman, 2006).

This article is one of a two part series examining the people and the environment associated with patient handling in an effort to better understand how and why nurses become injured on-the-job. Currently, it is estimated that 40% of occupational nursing injuries are attributed to some type of manual material handling (MMH), which is considered conservative by many professionals (ANA, 2003). In the healthcare industry, this refers to activities such as moving, repositioning and/or transporting of patients, transporting or moving carts or trays, changing or transporting of bulk linen, etc. In 2005, a report issued by CNA (2005), an insurance company, stated that individuals performing

patient transfers can have increased susceptibility to back injury or other injury due to personal characteristics. Suspect characteristics derived from literature that are believed to increase susceptibility to injury include age, gender, education, nursing experience, ward experience, history of prior back injury, and nature or cause of the injury (Fuortes et al., 1994; Engkvist et al., 2000; Engkvist, 2006; Gimeno et al., 2006). However, a notable exception is general personal health or fitness, which is normally one of the criteria evaluated when a jobsite is first evaluated in a proactive investigation of an at-risk job class. Hence, the approach utilized for this research was that of an occupational injury investigation, which incorporates defining in the task, environment, tools, and worker health status. The goal of this portion of the study was to develop a method of evaluating the general mental and physical health of a target population of nurses to determine their overall health status based on normative populations.

Methodology

The objective of this study was to determine and comparatively evaluate the general mental and physical health of nurses to known general populations (baseline). For this purpose, the state of Alabama (US) was chosen to be the testing population based on regional consideration and follow-on studies. From an international perspective, the state of Alabama is equivalent to the size of Greece with a general population of approximately 4.5 million people.

The study was executed using a known survey instrument, i.e. short form 36 question (SF-36®, 2006). This instrument was selected due to its established validation and reliability (Ware and Sherbourne, 1992; McHorney et al., 1993, 1994;

Ware et al., 1994, 1995; Ware and Kosinski, 2005), wide use (Watson et al., 1996; Jenkinson et al., 1993, 1999; Lyons et al., 1995; Mishra and Schofield, 1998), and available normative population data: US (Ware and Kosinski, 2005); Canadian (Hopman et al., 2000); UK (Jenkinson et al., 1993, 1999). The SF-36® is a copyrighted product of QualityMetric incorporated from which a license was obtained for this study and subsequent publication. The survey is composed of four physical and four mental variables/scales, which are tabulated from the 36 base questions. From these eight combined variables/scales, a composite physical and mental health score is assessed for the person, group, or population. A breakdown of the SF-36® components by question are shown in Fig. 1. Additional non-identifiable sociodemographic information was collected including height, weight, age, sex, years of experience, and type of healthcare organization.

Administration of the SF-36® was accomplished via a hard copy mailer with pre-paid self-addressed return envelopes enclosed. Alternate methods of return were via fax or email. A deadline return

date of six weeks was placed on the survey. A reminder postcard was sent two weeks after the initial survey mailing, which contained a basic reminder to complete and return the survey and a backup website address. The website was available for anyone who had misplaced their survey for download of an electronic copy. All received surveys were categorized as "anonymous." No returns were received as "confidential" emails.

The health status of registered nurses in Alabama, a state with high cardiovascular and diabetes morbidity rates, was investigated for comparison purposes (UAB, 2003; Gardner, 2007). Alabama ranks number 1 in diabetes. Potential subjects were chosen randomly by computer at the Alabama Board of Nursing from the pool of approximately 49,000 registered nurses in the state of Alabama. Selection was based on one criterion: subjects must have been registered with the Alabama Board on Nursing for at least one year. One thousand nurses were randomly selected. This number was based on the number of returns needed to gain statistical significance relative to the minimum expected return rates, which

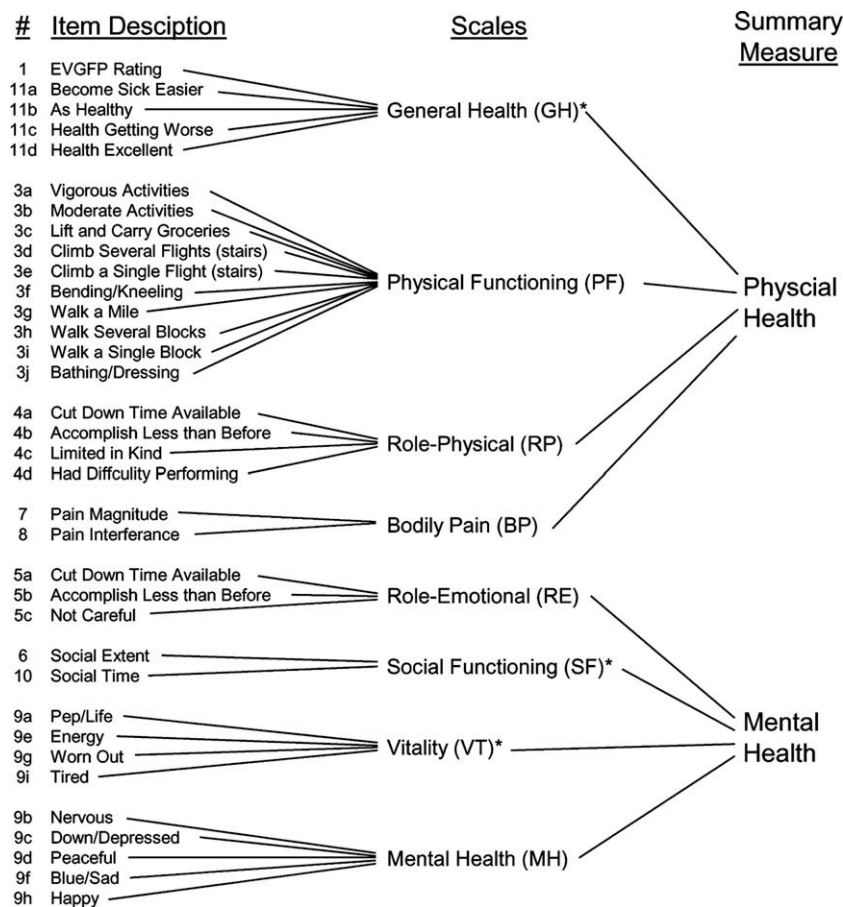


Figure 1 SF-36® Model (Ware and Kosinski, 2005).

traditionally are approximately 10% (Nelson, 2005). Approval for the study was received, prior to data collection, from the University's Institutional Review Board (IRB) for Human and Animal Subjects in Research.

Results

This study was approved by IRB in October of 2005 and was completed in May of 2006. A total of 101 returns (10.1%) were received with 87 having completed the SF-36®. All information recorded was categorized as self-reported. To verify that respondents were currently actively working, data on type of employing healthcare organization were collected. Health status for each subject was assessed using the SF-36® data with all items and scales being scored from 0 to 100 with 100 being the best possible score. Results were mean age- and gender-standardized and are presented in Table 1. All statistical analyses were performed using SAS® v9.1.3. All data and results displayed in Table 1 are based on nonparametric analysis. Hence, reporting of the percentage of the samples exceeding the upper (ceiling) and lower (floor) 95% confidence interval are displayed in order to gauge the group's distribution. Further analysis by healthcare organization yielded no significant information related to SF-36® data.

Reliability of the data was accomplished using Cronbach Coefficient Alphas and Pearson Correlation Coefficient procedures for each of the eight scale outcomes. In each case, scale outcomes had acceptable raw alpha scores (range 0.7887–0.9519). Additionally, the Pearson Correlation Coefficient procedure was also found to have acceptable results in all outcomes.

Following confirmation of validity, the data were stratified for comparison. Examination of the gender distributions revealed a disproportional amount of females reporting in the study, 92.0%. However, this is consistent with the male to female percentage for the US registered nursing population, which has been reported to be 92.2% females (BLS, 2004). Therefore, in order to achieve an accurate assessment of the current nursing population's health, results of female respondents were analyzed. Subsequently, gender stratification found 80 of the 87 respondents were female. Table 2 shows the female stratified data mean age- and gender-standardized. The number of male respondents yielded a sample size (7) that was too low for further statistical analysis.

Results for the female data were then tested against the most current known normative popula-

tion data, which were collected from 1998–1999 (Jenkinson et al., 1993, 1999; Hopman et al., 2000; Ware and Kosinski, 2005). The two additional comparison populations were chosen for several reasons:

- (1) The UK and Canada are socially similar to the US.
- (2) Population data were published and readily available.
- (3) Through mutual research, literature, and industry (healthcare) benchmarking sessions, many of the same problems in nursing have been shown to exist in all three countries.
- (4) Given there are mutual grounds, it is reasonable to make comparisons between the health of Alabama nursing in the US and these three countries given that each has been under a modern healthcare system for many years. Additionally, minor differences were expected in each country's population data due to cultural and healthcare system differences. However, none were found to be significantly different.

Fig. 2 illustrates the eight outcome scores for female Alabama nurses compared to the US, Canada, and U.K nursing populations.

Deviations from the normative populations were then examined using z-statistics at a significance level of 0.05. Results showed three outcomes to be significant: physical functioning, bodily pain, and social functioning. For each of these outcomes shown in Table 3, the *t*-value indicated female Alabama nurses in this study had worse health than one or more of the normative female populations of significance. For each outcome, the associated *t*-value and *p*-value for the population are displayed. Further, Table 3 gives a stratified breakdown of the three outcomes by age in order that individual differences may be seen.

Discussion

The goal of the study was to develop a method of evaluating the general mental and physical health of a target population of nurses. This method was then used to evaluate the health of one group of nurses compared to the US, Canadian, and United Kingdom (UK) populations to determine a baseline of overall health. For this purpose, a survey was administered to collect mental and physical health information with sufficient sociodemographic information to stratify the results. Results con-

Table 1 General statistics of SF-36© scores by age for Alabama nurses (*n* = 87), age- and gender-standardized.

Age, Yr	Physical function	Role physical	Bodily pain	General health	Energy/vitality	Social function	Role emotional	Mental health	Physical component Scale	Mental component Scale
25–34 (<i>n</i> = 5)										
Mean score	95.0	85.0	82.5	72.0	53.0	90.0	93.3	77.6	53.4	49.9
SD	8.7	33.5	9.8	9.1	12.5	16.3	14.9	13.7	5.7	9.1
95%CI										
% At floor										
% At ceiling										
35–44 (<i>n</i> = 21)										
Mean score	84.8	88.1	74.5	72.6	55.7	81.5	82.5	76.8	51.7	48.8
SD	24.4	31.2	23.3	25.9	20.0	21.5	30.9	18.8	9.6	9.8
95%CI	73.8–95.7	74.1–100	64.1–85.0	61.0–84.2	46.7–64.7	71.9–91.2	68.6–96.4	68.3–85.2	47.3–56.0	44.5–53.2
% At floor	4.8	9.5	14.3	19.0	14.3	9.5	19.0	23.8	14.3	19.0
% At ceiling	38.1	61.9	28.9	38.1	38.1	42.9	52.4	28.6	28.6	33.3
45–54 (<i>n</i> = 31)										
Mean score	89.8	86.3	77.1	75.8	63.2	79.0	74.2	76.8	53.6	47.8
SD	13.2	30.8	23.0	17.0	18.2	24.9	40.1	14.0	7.9	10.7
95%CI	85.0–94.7	75.0–97.6	68.6–85.6	69.6–82.0	56.5–69.9	69.9–88.2	59.5–88.9	71.6–81.9	50.7–56.5	43.9–51.7
% At floor	16.1	12.9	38.7	19.4	32.3	32.3	22.6	29.0	19.4	32.3
% At ceiling	48.4	77.4	54.8	35.5	58.1	41.9	64.5	51.6	41.9	54.8
55–64 (<i>n</i> = 30)										
Mean score	71.5	70.8	66.6	70.2	56.8	75.8	75.6	70.5	47.5	47.9
SD	33.8	44.6	29.9	26.4	24.9	29.5	40.1	21.9	11.9	11.9
95%CI	58.7–84.3	53.9–87.8	55.2–77.9	60.2–80.2	47.4–66.3	64.6–87.0	60.3–90.8	62.2–78.9	43.0–52.0	43.4–52.4
% At floor	30.0	30.0	26.7	33.3	36.7	33.3	26.7	26.7	36.7	30.0
% At ceiling	60.0	66.7	46.7	46.7	46.7	56.7	70.0	46.7	60.0	46.7
All ages (<i>n</i> = 87)										
Mean score	82.6	81.3	73.2	72.9	58.6	79.2	77.8	74.7	51.0	48.2
SD	25.7	36.6	25.4	22.4	20.6	25.3	36.9	18.2	10.0	10.7
95%CI	77.1–88.1	73.5–89.1	67.8–78.6	68.1–77.6	54.2–63.1	73.8–84.6	69.9–85.6	70.8–78.5	48.9–53.2	45.9–50.5
% at floor	19.5	19.5	36.8	26.4	36.8	28.7	31.0	34.5	26.4	33.3
% at ceiling	62.1	75.9	49.4	52.9	55.2	57.5	69.0	54.0	57.5	55.2

SD = standard deviation.

CI = confidence interval.

Floor = percentage of sample exceeding lower CI.

Ceiling = percentage of sample exceeding upper CI.

Table 2 General statistics of SF-36© scores by age for female Alabama nurses (n = 80), age- and gender-standardized.

Age, Yr	Physical function	Role physical	Bodily pain	General health	Energy/vitality	Social function	Role emotional	Mental health	Physical component scale	Mental component scale
25–34 (n = 4)										
Mean score	93.8	100.0	83.8	72.5	52.5	90.6	91.7	76.0	55.1	48.8
SD	9.5	0.0	10.9	10.4	14.4	18.8	16.7	15.3	4.7	10.1
95%CI										
% At floor										
% At ceiling										
35–44 (n = 19)										
Mean score	83.2	86.8	72.9	70.3	55.3	82.2	82.5	75.6	50.9	48.8
SD	25.2	32.7	23.7	26.1	20.0	21.0	32.1	19.4	9.9	10.0
95%CI	71.0–95.3	71.1–100	61.5–84.3	57.7–82.8	45.6–64.9	72.1–92.3	67.0–97.9	66.2–84.9	46.2–55.7	44.0–53.6
% At floor	21.1	15.8	26.3	31.6	26.3	15.8	26.3	21.1	26.3	31.6
% At ceiling	42.1	84.2	31.6	47.4	47.4	47.4	73.7	31.6	36.8	36.8
45–54 (n = 28)										
Mean score	89.5	85.7	77.8	76.8	64.1	79.9	77.4	77.4	53.5	48.6
SD	13.5	32.2	23.0	16.7	16.4	23.7	38.5	13.7	8.1	10.2
95%CI	84.2–94.7	73.2–98.2	68.9–86.7	70.3–83.3	57.7–70.5	70.7–89.1	62.4–92.3	72.1–82.8	50.3–56.6	44.6–52.5
% At floor	14.3	14.3	35.7	32.1	28.6	32.1	17.9	32.1	17.9	28.6
% At ceiling	46.4	78.6	57.1	35.7	42.6	42.9	67.9	53.6	39.3	57.1
55–64 (n = 29)										
Mean score	70.7	69.8	66.2	70.2	56.4	75.9	74.7	70.8	47.3	47.9
SD	34.1	45.0	30.4	26.8	25.2	30.1	40.5	22.3	12.0	12.1
95% CI	57.7–83.7	52.7–86.9	54.7–77.8	60.0–80.4	46.8–66.0	64.4–87.3	59.3–90.1	62.3–79.2	42.7–51.8	43.3–52.5
% At floor	31.0	31.0	27.6	27.6	37.9	34.5	27.6	27.6	37.9	27.6
% at ceiling	58.6	65.5	48.3	48.3	44.8	58.6	69.0	48.3	58.6	48.3
All ages (n = 80)										
Mean score	81.4	80.9	72.7	72.6	58.6	79.5	78.3	74.5	50.7	48.4
SD	26.4	37.4	25.9	22.8	20.8	25.3	36.8	18.5	10.2	10.7
95%CI	75.5–87.2	72.6–89.2	67.0–78.5	67.6–77.7	54.0–63.3	73.9–85.1	70.2–86.5	70.4–78.6	48.4–53.0	46.0–50.8
% at floor	21.3	20.0	37.5	27.5	36.3	28.8	30.0	35.0	26.3	32.5
% at ceiling	60.0	76.3	50.0	53.8	56.3	56.3 57.5	70.0	53.8	57.5	56.3

SD = Standard deviation.

CI = confidence interval.

Floor = percentage of sample exceeding lower CI.

Ceiling = percentage of sample exceeding upper CI.

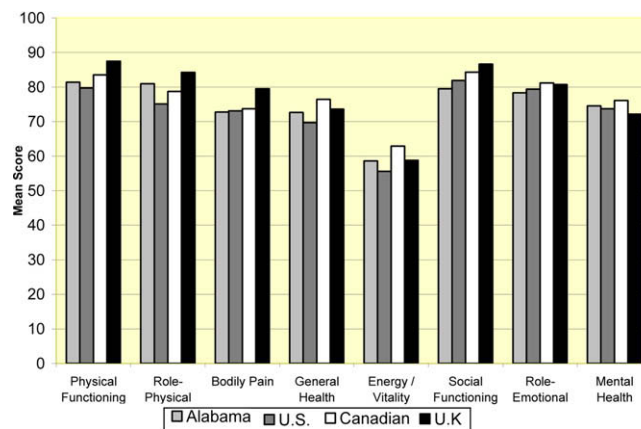


Figure 2 Female Alabama nurses (light gray) compared with normative female US (medium gray), Canadian (white), and UK (black) populations.

Table 3 Significant Comparisons of female Alabama nurses to US, Canadian, and UK female populations by age.

Age	Alabama nurses (comparison group)	United Kingdom ($t_0 = 2.58, p = 0.012$)	
<i>Social functioning</i>			
25–34 years ^a	90.6	87.7	
35–44 years	82.2	86.7	
45–54 years	79.9	87.0	
55–64 years	75.9	85.9	
All ages	79.5	86.6	
Age	Alabama nurses (comparison group)	United Kingdom ($t_0 = 2.47, p = 0.016$)	Canada ($t_0 = 2.29, p = 0.025$)
<i>Physical functioning</i>			
25–34 years ^a	93.8	92.9	90.9
35–44 years	83.2	89.4	90.1
45–54 years	89.5	84.8	86.6
55–64 years	70.7	74.8	79.9
All Ages	81.4	87.5	83.5
Age	Alabama nurses (comparison group)	United Kingdom ($t_0 = 3.68, p < 0.001$)	United States $t_0 = 2.12, p = 0.037$
<i>Bodily pain</i>			
25–34 years ^a	83.8	82.1	79.6
35–44 years	72.9	79.4	74.9
45–54 years	77.8	77.4	72.1
55–64 years	66.2	75.0	66.6
All ages	72.7	79.5	73.3

^a The size of sample (n) was not large enough to support any conclusions.

firmed nursing is a female dominated profession in Alabama and in the US, 92%. Comparisons to the most current available US, Canadian, and UK populations found health deficiencies in outcomes of physical functioning, bodily pain, and social functioning among Alabama nurses relative to these normative populations, particularly in the 35–44 year age group. Further, although this group had consistently poorer health in all three out-

comes, specifics as to why this occurred have yet to be determined. Upon discussions with research members and focus groups, plausible but not verified reasons for the reduced health status are:

- (1) Many US nurses' initial jobs out of school have been shown to be heavily slanted toward patient handling tasks, which become less frequent as they become more integrated

into all aspects of healthcare either by seniority or qualification. Since physical stress associated with patient transfer, a manual material handling activity, is known to be cumulative in nature, the reduced physical health and bodily pain seen in respondents age 35–44 could be a result of the effects of cumulative physical job stress.

- (2) The health of American nurses seems have the same current status or worse than that of the general population. A US population reported by numerous public health organizations to have a declining trend in physical fitness for decades (Mokdad et al., 2004; Sturm, 2005). Hence, nurses may be less physically fit than those in previous decades and/or generations, possibly resulting in a quicker decline of physical health in early to middle-age adulthood. Results seen from this type of trend could potentially correspond to lower physical, mental and social function of the individual and could explain Table 3, which shows respondents in the 35–44 age group as the only group that is consistently lower in both three significant outcomes
- (3) Another possible explanation for the seeming decline health status of this age group may be attributed to the demands of work and family. Nurses may become overwhelmed by the pace and hours (12 h shifts) in combination with family responsibilities for young children that are common in this age group. This could

result in stress, which has been shown to cause a variety of personal issues both mental and physical.

- (4) The increased body mass index (BMI) found in all ages in the US since 1986 are considered strong predictors of the nation's overall health and fitness by many public health professionals. Hence, two decades of data show a constant decline of health in the US. This trend was also seen in many of the stratified age groups of nurses during this study. Some supporting data for this relationship can be seen in Table 4, where subjects' BMI have been stratified by age. In both the total group and the female participants, the age group 35–44 years shows the highest average BMI. Additionally, this group also has the lowest percentage of "healthy" individuals and the highest level of obesity. And while the actual reason for this is unknown, speculation regarding this age group is that they could have increased responsibilities at home in addition to work that does not allow for time to attend to their own health and fitness, since this age group has the highest probability for having young children at home.

However, these ideas are just speculation, since these data are only a snap-shot of these nurses' health. Only a cause and effect longevity study would allow for a true understanding of the events that lead to the findings presented here and their eventual outcomes.

Table 4 Alabama nurses body mass index (BMI) from self-report height and weight by age by category.

Age	Average BMI (SD)	Total count (not reporting)	Counts by category			
			Healthy 18.5–24.9	Overweight 25.0–29.9	Obese 30.0–39.9	Extremely obese >40
<i>All subjects</i>						
25–34 years ^a	28.88 (7.28)	5 (0)	1 (20%)	2 (40%)	1 (20%)	1 (20%)
35–44 years	29.78 (6.89) ^b	20 (1)	4 (20%)	7 (35%)	8 (40%)	1 (5%)
45–54 years	27.07 (5.34)	28 (3)	11 (39%)	10 (36%)	6 (21%)	1 (4%)
55–64 years	29.03 (5.63)	26 (4)	6 (23%)	10 (38%)	9 (35%)	1 (4%)
All ages	28.52 (5.97)	79 (8)	22 (28%)	29 (37%)	24 (30%)	4 (5%)
<i>Female</i>						
25–34 years ^a	26.02 (4.00)	4 (0)	1 (25%)	2 (50%)	1 (25%)	0 (0%)
35–44 years	29.92 (7.17) ^c	18 (1)	4 (22%)	6 (33%)	7 (39%)	1 (6%)
45–54 years	27.16 (5.41)	27 (1)	10 (37%)	10 (37%)	6 (22%)	1 (4%)
55–64 years	29.13 (5.73)	25 (4)	6 (24%)	9 (36%)	9 (36%)	1 (4%)
All ages	28.44 (5.96)	74 (6)	21 (28%)	27 (37%)	23 (31%)	3 (4%)

^a The number of sample (*n*) is not large enough to support any conclusions.

^b 2002 US average 28.0 CDC (2004).

^c 2002 US average 28.2 CDC (2004).

Potential limitations

This study was based on a self-selected limited population cross-section of 87 nurses of a possible 1000 nurses, which had been randomly selected from the pool of 49,000 nurses registered/licensed in the state of Alabama. With 87 participants, the minimum sample needed to insure statistical power for the unstratified (population) results was achieved. However, stratified results did not reach the minimum sample size for all groups to support definitive conclusions about relationships between groups. Specifically, since the 25–34 age groups did not have sufficient response to support individual or comparative analysis to other stratified groups, the speculative reasons in the discussion remain tentative. Additionally, all data presented is classified as snap-shot data, which should only be use to evaluate the sample surveyed for the time period collected and should not be used to make general assumption regarding the population. Therefore, additional research is needed to further address and/or clarify these preliminary finding. The findings do, however, raise concerns about the health of the nursing workforce, particularly in the US, and if the status of Alabama nurses is representative of the nursing population as a whole.

Other limitations and concerns related to self-reporting (Garrett et al., 1992; Holman, 2006) include: (1) low response rates, which raise a question of whether “selection bias” has occurred, since only five nurses responded in the 25–34 age group; (2) the possibility of omissions in self-reported data questions thus impacting accuracy and completeness; (3) response bias, which is a known issue with performing surveys in healthcare. Specifically, problems known to exist with surveying nurses relate to under-reporting injuries and events leading to injury have be widely reported in multiple studies (Stetler et al., 2003; Nelson et al., in press).

Conclusion

The Alabama nurses’ scores presented here for the eight outcomes and two summary measures of the SF-36© are similar to the normative population data for the US, Canada and UK. However, three of the eight outcomes showed a significant difference between Alabama nurses and at least one of the normative population groups. In each case, Alabama nurses had significantly worse health, which can be potentially linked to common physical

stressors found in healthcare settings (Holman, 2006) and their cumulative effect. For example, frequent patient transfers and/or heavy lifting (greater than 50lbs or 22 kg) could potentially result in greater bodily pain than normally experienced by an average person.

Other results show personal health factors such as BMI of Alabama nurses have the same increasing trend as the general US population, which only potentially magnifies their risk for injury in a physically demanding job. However, while only future research can answer the question of increased risk, this study does provide some limited insight into the health of this segment of the US nursing population. Further, the findings do raise concerns about the health of the nursing workforce in this sample and their ability to safely continue delivering healthcare over time. Administrators and policymakers need to consider the importance of these preliminary findings as they relate to nurse retention. Influences on health status need to be discussed. For example, the twelve hour shift, which is the common shift schedule in nursing, requires extended professional decision-making, increased exposure to physical and mental demands that may impact health. Shift-work also influences social functioning of workers (Monk and Folkard, 1992; Costa, 2003). In the future, an aging nursing workforce may not be willing to risk potential injury and negative influences on personal health status associated with healthcare. Alternative shift schedules with fewer hours and consequences of the demands placed on nurses should be topics of discussion in all institutions interested in worker retention, hence limiting nursing staff turnover.

One recommendation for nursing education involves the need to provide instruction to nursing students on maintaining their personal health as they go forward into their chosen career. Education is needed not only with regards to critical thinking and decision making in the professional nursing role but also in how to manage personal mental and physical health as related to the everyday rigors of their future jobs. Simply, education should provide realistic information on the job requirement, possible impact on physical, mental and social health, and the appropriate coping tools.

The future demands on healthcare in the US and internationally will only increase as populations around the world age with the “baby boom” generation. Therefore, it is essential to understand issues related to health status of the healthcare’s largest employee group, i.e. nurses, in order to sustain the consistent, uninterrupted contributions of these workers over their careers.

Future research

This study has shown significant differences among nurses from three different general populations, but it questions if this difference is uniform throughout the US. Additionally, questions have been raised as to the level of influence a nurse's personal characteristics have in on-the-job injury. In each case, future research is needed to define and understand associated risks both personal and environmental to prevent occupational injury and illness and burnout. Finally, research is needed to explore the three outcomes for which nurses in this sample were shown to have a reduced health status. Only through further research to define the specific influencing factors affecting these outcomes can proper countermeasures be developed and subsequent policy and procedure recommendation be made for improving overall health status of this valued group.

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