We Cannot Ignore Nurses' Health Anymore: A Synthesis of the Literature on Evidence-Based Strategies to Improve Nurse Health

By: Susan Letvak

This is a non-final version of an article published in final form in

Made available courtesy of Lippincott, Williams, & Wilkins:
http://dx.doi.org/10.1097/NAQ.0b013e3182a2f99a

Abstract:

Nurses are known to suffer from health problems because of the physical and stressful nature of nurses' work. With the advent of health care reform and the increasing importance of nurses to quality and cost-effective health care, the health of nurses can no longer be ignored. The purpose of this synthesis of the literature is to determine what interventions and evidence-based practices have been found that support and improve the health of nurses. Whittemore and Knafl's integrative review methodology was chosen to guide the synthesis. Eighteen studies, all conducted in clinical settings, were identified. Interventions included on-site wellness, ergonomic and exercise programs; holistic practices, including Tai Chi and massage; the use of clinical supervision; mental health programs; and the use of minimal, no lift and lift-team programs. There is a critical need for more research specifically designed to improve the health and safety of the nursing workforce.

Keywords: evidence-based practice | nurse health | occupational health

Article:

THE US DEPARTMENT OF LABOR, Bureau of Labor Statistics [1] describes the profession of nursing as one that can be considered hazardous. Specifically, nurses spend a lot of time walking, bending, stretching, and standing. They are vulnerable to injury and are in close contact with people with infectious diseases as well as with potentially harmful drugs and other substances. They are also required to work long hours and may have rotating and non–daytime work hours. It is well known that nurses experience high job stress and are prone to injury and musculoskeletal problems.[2] However, with the advent of health care reform and the recent

Institute of Medicine Report on the Future of Nursing [3] highlighting nurses as critical to quality, cost-effective health care, the health of nurses can no longer be ignored. The purpose of this synthesis of the literature is to determine what interventions and evidence-based practices have been found that support and improve the health of nurses.

NURSE HEALTH

Palmer[4] titled her historical review of nurse health at the end of the 19th century as, "To help a million sick, you must kill a few nurses" to illuminate the difficult working conditions nurses faced in Great Britain at this time. Unfortunately, nurses today continue to be challenged by health risks and problems related to the work of a nurse. Fronteira and Ferrinho[5] recently conducted a synthesis of the literature on what is known about the physical health of nurses. After reviewing 187 international studies, they concluded that nurses suffer from more musculoskeletal disorders, are at greater risk of acquiring tuberculosis and blood-borne pathogen infections, and have more occupational allergies. Mental health conditions were not included in the research.

A person's health impacts a person's ability to work, especially in physically demanding jobs. The term presenteeism is used to signify productivity loss when a worker is present at work but not functioning at full performance because of a health problem. Major causes of worker presenteeism are musculoskeletal problems and mental health issues (primarily depression).[6] This is important because musculoskeletal problems and depression occur at high rates in nurses.[7]

In any given year, the majority of nurses suffer from a musculoskeletal disorder or pain. In a review of the literature on health consequences for nurses, Geiger-Brown and Lipscomb[8] report that the 12-month prevalence of low back pain ranges from 45% to 76%, neck pain 28% to 60%, shoulder 35%, and knee pain 22%; the lifetime prevalence for a musculoskeletal symptom is 85%. Of importance, research has found that 72.3% of workers with musculoskeletal and back pain report activity limitations and 79.6% report significant loss of productivity.[9]

Nursing is increasingly stressful, and psychosocial demands are high. Indeed, health care workers ranked third for depressive episodes of all occupations between 2004 and 2006.[10] A recent study of hospital-employed nurses found 17% of nurses had clinical depression, which is almost double the national rate of 9%.[7] Depressed workers are more likely to make errors and are accident prone due to problems with concentration and focus associated with depression.[11]

Information about nurse health can also be gleaned from published research from the longitudinal Nurses' Health Study (NHS), which began in 1976.[12] While the first studies followed only married nurses who were 30 to 55 years old in 1976, the NHS has since expanded to an invitation to all registered nurses with surveys being administered approximately every 4 years. It is important to note that nurses were chosen to study not because the researchers were interested in NURSE health, but because nurses were known to respond with accuracy to

technically worded questionnaires and would be motivated to participate in longitudinal research. It is unknown how many participants were actively working as nurses or still in the profession at the time they completed their questionnaires. The majority of the vast number of published studies since 1979 do not allude to nurses in their titles or discussion findings. However, some major NHS findings include the following: smoking is associated with coronary heart disease, stroke, colon cancer, hip fractures, and cataracts; current oral contraceptive use increases the risk of breast cancer, coronary heart disease, and age-related macular degeneration but reduces the risk of colon cancer; and obesity increases the risk of postmenopausal breast cancer, increases the risk of coronary heart disease, stroke, colon cancer, cataracts, and age-related macular degeneration, and decreases the risk of colon cancer. See Table 1 for additional NHS highlights. Several published studies from the NHS do speak directly to nurse health, especially pertaining to shift work. Schernhammer and colleagues[28] reported on 53487 women who had rotating night shift work. They found that women who worked more than 20 years of rotating night shifts had a significantly increased risk of endometrial cancer, which they speculated was due to the effects of melatonin on hormonal and metabolic factors. Another study from this same cohort of women found that women with more than 20 years of night shift work also had a significantly increased risk of wrist and hip fractures. This risk was strongest in women with lower body mass index who never used hormonal replacement therapy.[29]

Table 1. Nurses' Health Study Highlights

Author(s)	Purpose	Sample Size	Population	Methods	Findings
Brunero et al[13]	Determine the effect of CBT to reduce nurse stress.	18	New graduate nurses in an Australian hospital.	Pretest, posttest survey design.	After an 8-h workshop using CBT, there was a significant decrease in stress scores (NSS).
Diaz-Rodriguez et al[14]	Determine the effect of a single 30-min Reiki. session on sIgA activity and blood pressure.	18	Female nurses with burnout syndrome in a Spanish hospital.	Randomized, double-blind, place-bocontrolled crossover design.	After a single Reiki treatment, there was a significant increase in sIgA and diastolic blood pressure.
Keene, et al[15]	Determine the effect of grief-debriefing sessions on managing grief and professional integrity.	676 health care workers (374 nurses)	Health care workers at Johns Hopkins Children's Hospital.	Pretest, posttest survey design.	Staff who participated in sessions had significantly higher grief management scores and professional integrity scores
Koivu et	Examine the	166 (119	5 units of	Quasiexperimental	After 4 y of the

al[16]	effectiveness of clinical supervision on nurses' health.	RNs)	a large Finnish teaching hospital.	design.	program, there were no significant differences in perceptions of health. There were significant decreases in professional inefficacy and psychological distress scores.
Kravits et al[17]	Evaluate a psychoeducational program's effectiveness on nurse stress and burn out.	248	New graduates at a Southern California Cancer Center and other new nurses.	Pretest/posttest survey design.	High rate of missing data. There were decreases in emotional exhaustion, burn out, and feelings of depersonalization.
Mackenzie et al[18]	Evaluate the effect of mindfulness training on burnout symptoms, relaxation, and life satisfaction	30	RNs (18), LPNs (5) and NAs (7) from long-term units of a large teaching hospital in Canada.	Two-group (intervention/control) quasi-experimental design.	There were no significant decreases in outcome measures after 4-wk intervention, although trends were in the right direction, which supports feasibility of the intervention.
Martin, et al[19]	Evaluate the effect of a Nurse No Lifting Policy across a hospital system.	52 hospitals	Back injury claims from hospitals in the Victoria, Australia Health System.	Longitudinal analysis of 10 y of back injury claims.	Statistically significant trends demonstrated a decrease in claims was found with an overall reduction of 24%.
Meeks-Sjostrom et al[20]	Determine the impact of a minimal lift program on job satisfaction and injury.	950 nurses for compensation data; 88 survey participants	Direct care nurses in a southern US hospital.	Descriptive exploratory design.	After 1 y, the minimal lift program demonstrated a 13% increase in job satisfaction,

					decreased workers comp claims by 1/3 and a significant decrease in lost workdays per month.
Palumbo et al[21]	Assess the feasibility of a Tai Chi wellness program to improve older nurse health.	11	Female nurses with a mean age of 54.4 y employed in an academic medical center.	Randomized control trial (2 group).	The Tai Chi group had significantly less absences and a 3% increase in productivity. No significance in physical or mental health scores (SF-12)
Richards et al[22]	Determine the experiences of a spiritually based intervention on nurses' personal/health outcomes.	24	12 of the 24 nurses had direct patient contact; 83% were aged 41-60 y.	Two group (intervention/control) qualitative design.	Intervention group described increased ability to focus and better emotional balance.
Scott et al[23]	Determine the effectiveness of a fatigue counter-measures program on nurse sleepiness and sleep quality.	37	Nurses employed full-time on medical-surgical units.	A 1-group pretest/posttest repeated measures design.	Significant improvements in sleep duration, quality, and alertness were found at 4 and 12 wk postintervention; no significant improvements in daytime sleepiness scores.
Speroni et al[24]	Determine the effect of the Nursing Living Fit Program on BMI.	126	Nurses recruited from 7 hospitals in 3 Mid-Atlantic States	Two group (intervention/control) quasi-experimental design.	After a 12-wk intervention, the intervention group had a significant decrease in BMI. This effect did not hold at 24-wk follow-up.
Springer et al[25]	Determine the effect of a lift team on employee injury.	Not given	350-bed urban acute care hospital in	Descriptive correlational design. Data collected over 4 y.	No significant decrease in employee injury after

			the Pacific Northwest		implementation of a lift team.
Tucker et al[26]	To pilot test the feasibility and preliminary effects of a worksite physical activity intervention for nurses who are working mothers.	58	Acute care hospital in	Quasi-experimental design.	After the 10-wk intervention, no significant effects were found for physical activity, significant effects were found for body fat mass.
Yuan et al[27]	Assess the effects of an exercise intervention on nurses' health-related physical fitness.	9	Medical center in Taiwan	Quasi-experimental design; 3-mo intervention.	Experimental (exercising) group had significant improvements in BMI, grip strength, flexibility, abdominal and back muscle durability, and cardiopulmonary durability.

In summary, the health problems of nurses are clearly documented in the literature. Importantly, a recent study found that hospital-employed nurses who experience musculoskeletal pain and depression have higher presenteeism scores, which impacted their quality of patient care.[7] Clearly, the health of nurses is not just a personal problem for nurses who suffer the negative effects of their work, their health may also impact quality of care and patient safety, and ultimately costs. An understanding of interventions that have been utilized to improve nurse health would assist others in providing much needed program and supportive services.

METHODOLOGY

Whittemore and Knafl's [30] integrative review methodology was chosen to guide this synthesis. The method encompasses diverse forms of research studies and can be used to guide evidence-based practice strategies. The strategy includes (1) identifying the problem (which includes identifying the variables of interest and sampling frame), (2) searching the literature, (3) evaluating the data for inclusion in the synthesis, (4) analyzing the data (which includes ordering, coding, and summarizing each source), and (5) presenting the findings.

For the purpose of this review, the problem identified was the identification of research- and evidence-based practices to improve nurse health. The review was carried out via the following databases: Blackwell, Cinahl, E-Journals, Google Scholar, Medline, ProQuest, PubMed, and Science Direct. To reflect the current state of the science, the search was limited to research- or

evidence-based studies that were published in English between 2000 and 2012. With the assistance of a medical librarian, search terms included "intervention," "nurse," "nursing," "nurse health," "nurse health status," "nurse health problems," "health care worker health," "healthy work environments," "psychological well-being," "musculoskeletal pain," "musculoskeletal problems," "back pain," "needlestick injury," "occupational health," "occupational injury," and "presenteeism."

Several thousand articles were identified. The search was then limited utilizing a Boolean search and to include only the key words "nurses," "health care worker," "intervention," or "evidence-based practice" and NOT "patient," "nursing intervention," or "review." Studies also had to be research based and peer-reviewed. This led to just more than 150 articles. As step 3 in the review process, abstracts were then reviewed to be sure there was an actual intervention to improve health and for the specific mention of nurses in the study sample. This removed the majority of the articles. Despite the large number of initial "hits," only 18 studies were found that were either an intervention or evidence-based practice study specific to improving the health of nurses (see Table 2). Because of the limited number of studies found and diversity of interventions and outcomes, step 4, which would have included evaluating and rank-ordering studies by methodological or theoretical rigor, was not done. In step 5, study findings were analyzed and organized by general focus area. As the last step, the studies found in the review of the literature are presented.

Table 2. Literature Review

Author(s)	Purpose	Sample Size	Population	Methods	Findings
Borges, et al[31]	Determine the effectiveness of massage to relieve low back pain.	18	Brazilian nurses with back pain who worked on a spinal cord injury unit.	Quasi-experimental study design.	After 7 or eight 30-min therapeutic massage sessions, participants had a significant decrease in pain scores.
Brunero et al[13]	Determine the effect of CBT to reduce nurse stress.	18	New graduate nurses in an Australian hospital.	Pretest, posttest survey design.	After an 8-h workshop using CBT, there was a significant decrease in stress scores (NSS).
Diaz-Rodriguez et al[14]	Determine the effect Reiki session sIgA activity and blood pressure.	18	Female nurses with burnout syndrome in a Spanish hospital.	Randomized, double-blind, placebo-controlled crossover design.	After a single 30-min Reiki treatment there was a significant increase in sIgA and decrease in diastolic blood

					pressure.
Jaromi et al[32]	Determine the effectiveness of a spine training program (Back School).	124	Hungarian hospital nurses with self-identified back pain.	Single-blinded randomized control trial design.	There was significant decreases in back pain intensity in both groups postintervention; only the intervention group showed better results at 6-mo and 1-y follow-up. Significantly improved posture in the intervention group.
Keene et al[15]	Determine the effect of grief-debriefing sessions on managing grief and professional integrity.	676 (374 nurses)	Healthcare workers at Johns Hopkins Children's Hospital.	Pretest, posttest survey design.	Staff who participated in sessions had significantly higher grief-management scores and professional integrity scores.
Koivu et al[16]	Examine the effectiveness of clinical supervision on nurses' health.	166 (119 RNs)	5 units of a large Finnish teaching hospital.	Quasi-experimental design.	After 4 y of the program, there were no significant differences in perceptions of health. There were significant decreases in professional inefficacy and psychological distress scores.
Kravits, et al[17]	Evaluate a psychoeducational program's effectiveness on nurse stress and burnout.	248	New graduates at a Southern California Cancer Center and other new nurses.	Pretest/posttest survey design.	High rate of missing data. There were decreases in emotional exhaustion, burnout, and feelings of depersonalization.
Mackenzie et al[18]	Evaluate the effect of mindfulness training on	30 (18 RNs)	Direct care providers from long-	Two-group (intervention/control) quasi-experimental	There were no significant decreases in

	burnout symptoms, relaxation, and life satisfaction.		term care units of a teaching hospital in Canada.	design.	outcome measures after 4-wk intervention, although trends were in the right direction, which supports feasibility of the intervention.
Martin et al[19]	Evaluate the effect of a Nurse No Lifting Policy across a hospital system.	52 hospitals	Back injury claims from hospitals in the Victoria, Australia Health System.	Longitudinal analysis of 10 y of back injury claims.	Statistically significant trends demonstrated a decrease in claims with an overall reduction of 24%.
Nelson, et al[33]	Test the effectiveness of a multifaceted ergonomics program to prevent nurse injuries.	825 (RNs 36%)	Direct care workers from 23 units in 7 facilities in the Southeast US.	Pretest/posttest design.	Postintervention there was significantly less musculoskeletal injuries and days off work from injury but no increase in job satisfaction scores.
Meeks-Sjostrom et al[20]	Determine the impact of a minimal lift program on job satisfaction and injury.	950 nurses for comp. data; 88 survey participants	Direct care nurses in a southern US hospital.	Descriptive exploratory design.	After 1 y, the minimal lift program demonstrated a 13% increase in job satisfaction, decreased workers comp claims by 1/3, and a significant decrease in lost workdays per month.
Palumbo et al[21]	Assess the feasibility of a Tai Chi wellness program to improve older nurse health.	11	Female nurses with a mean age of 54.4 y employed in an academic medical center.	Randomized control trial (2 group).	The Tai Chi group had significantly less absences and a 3% increase in productivity. No significant differences in physical or mental

					health scores (SF-12).
Richards et al[22]	Determine the experiences of a spiritually based intervention on nurses' personal/health outcomes.	24	12 of the 24 nurses had direct patient contact. 83% were aged 41-60 y.	2 group (intervention/control) qualitative design.	Intervention group described increased ability to focus and better emotional balance.
Scott et al[23]	Determine the effectiveness of a fatigue counter-measures program on nurse sleepiness and sleep quality.	37	Nurses employed full-time on medical-surgical units.	1-group pretest/post test repeated-measures design.	Significant improvements in sleep duration, quality, and alertness were found at 4- and 12-wk postintervention; no significant improvements in daytime sleepiness scores.
Speroni et al[24]	Determine the effect of the Nursing Living Fit Program on BMI.	126	Nurses recruited from 7 hospitals in 3 Mid-Atlantic States.	2 group (intervention/control) quasi-experimental design.	After a 12-wk intervention, the intervention group had a significant decrease in BMI. This effect did not hold at 24-wk follow-up.
Springer et al[25]	Determine the effect of a lift team on employee injury.	Not given	350-bed urban acute care hospital in the Pacific Northwest.	Descriptive correlational design. Data collected over 4 y.	No significant decrease in employee injury after implementation of a lift team.
Tucker et al[26]	To pilot test the feasibility and preliminary effects of a worksite physical activity intervention for nurses who are working mothers.	58	Working mothers in an acute care hospital.	Quasi-experimental design.	After the 10-wk intervention, no significant effects were found for physical activity, significant effects were found for body fat mass.
Yuan et al[27]	Assess the effects of an exercise intervention on nurses' health-related physical	9	Nurses at a medical center in Taiwan.	Quasi-experimental design; 3 mo intervention.	Experimental (exercising) group had significant improvements in BMI, grip

				strength, flexibility, abdominal and back muscle durability, and cardiopulmonary durability.
fitness.				

FINDINGS

Of the 18 identified intervention studies specific to improving nurse health, 17 were conducted in hospital settings and 8 were conducted outside of the United States (Australia, Brazil, Canada, Finland, Hungary, Spain, and Taiwan). One study utilized a qualitative design. Of the 17 other studies, 9 studies used an experimental design and 8 used a descriptive design. Sample sizes ranged from 9 to 950 nurses, with 1 study not reporting a sample size.

Five intervention studies and 1 descriptive longitudinal study were designed to reduce employee injury and/or reduce back pain. Three of the studies involved determining the effectiveness of no lift, minimal lift, or lift team programs. Meeks-Sjostrom et al[20] conducted a descriptive, exploratory study designed to examine satisfaction and level of patient movement-related injuries after institution of a minimal lift program in an acute care hospital in the Southeastern United States. The sample was all 950 nurses employed in the facility; however, only 88 nurses returned a postintervention survey, which was distributed after the 6- to 8-week intervention period. Development of the minimal lift program was found to increase nurse satisfaction by 13% in the 88 participants; however, hospital workers' compensation costs were down one third and lost workdays decreased per month. Springer and colleagues[25] evaluated the effect of a lift team on employee injury in a more than 350-bed medical center in the Pacific Northwest. Pre-post data comparison of nurse injury was done after a 1-year time period. There were no significant decreases in nurse injury when adjusted for acuity and census. Anecdotal evidence indicated the lift team program was popular with both nurses and patients. Finally, Martin and colleagues[19] evaluated the effect of a no lift policy on back injury compensation claims in 56 Australian hospitals over a 5-year period. There was a statistically significant decline in compensation claims (24%) over the study period, which signified a substantial improvement in nurse safety.

Nelson and colleagues[33] utilized a pretest/posttest design to test the effectiveness of a multifaceted ergonomics program to prevent injuries involved with patient handling tasks. The intervention included education, ergonomics assessment, and a no-lift policy. Participants were recruited from 23 high-risk hospital units (19 nursing home care and 4 spinal cord injury) in 7 hospitals in the southeast United States. Registered nurses made up 36% of the 825 direct care workers who participated. After intervention, there was a statistically significant decrease in musculoskeletal injuries and days off taken for injury. There was no significant increase in job

satisfaction. Jaromi and colleagues[32] utilized a single-blinded randomized control trial to determine the effectiveness of a spine training program (Back School) on 124 Hungarian nurses with back pain. The intervention group received ergonomics training and education, muscle strengthening, and stretching exercises while the control group received only passive physiotherapy. Data analyses found a significant decrease in back pain intensity in both groups postintervention; however, only the intervention group showed better results at 6-month and 1-year follow-up. There was also significantly improved posture in the intervention group further supporting the effectiveness of the Back School program. Borges and colleagues[31] utilized a quasi-experimental study design to determine the effectiveness of massage on 18 Brazilian nurses who worked on a spinal cord injury unit and experienced low back pain. The mean age of the nurses was 38 years, and they had experienced back pain from 6 months to 25 years (mean of 6.5 years). Following 7 or eight 30-minute therapeutic massage sessions, participants had a significant decrease in pain scores demonstrating the effectiveness of massage for the treatment of low back pain in nurses.

Two intervention studies were found that were designed to improve nurse physical activity or physical fitness. Yuan and colleagues[27] used a quasi-experimental design to evaluate the effects of a 3-month treadmill intervention designed to improve health-related physical fitness in 95 nurses at a medical center in Taiwan. Fitness was measured using the Labour's Physical Fitness Test Method. The experimental group had a significantly improved body mass index (BMI) and increased grip strength, flexibility, abdominal muscle durability, back muscle durability, and cardiopulmonary durability. Tucker and colleagues[26] conducted a study designed to improve the physical activity of working mothers. A quasi-experimental design was used. Fifty-eight nurses participated in a 10-week worksite physical activity intervention integrated into their daily work assignments. Pedometers were provided to the experimental and control groups. For both groups, the average steps walked per day were similar before and after intervention. However, intervention participants had a significant decrease in their fat mass, fat index, and percent fat indicating they may also have altered their diet and home activities during the intervention period.

The majority of intervention studies found were designed to improve the general physical and/or mental health of nurses. Three studies utilized exercise programs to improve nurse health. Diaz-Rodriguez and colleagues[14] utilized a randomized, double-blind, placebo-controlled design to determine the effect of a single 30-minute Reiki session on salivary sIgA activity and blood pressure. sIgA is a first-line defense against pathogenic microorganisms and is lowered in response to high levels of stress. Eighteen female nurses with a mean age of 43.7 years and known Burnout Syndrome from a hospital in Spain participated. After a single Reiki session, there was a statistically significant increase in sIgA levels and decrease in diastolic blood pressure, which supports that a relatively brief exercise session can calm stressed nurses. Palumbo and colleagues[21] recruited 11 female nurses with a mean age of 54.4 to participate in once a week Tai Chi classes at their hospital and to perform the exercises 10 minutes per day at

least 4 days per week over the 15-week intervention period. Multiple study measures were used including the SF-36, Nursing Stress Scale, Perceived Stress Scale, sit-and-reach test, isometric knee extensor strength test, functional reach test, Nordic Musculoskeletal questionnaire, the Work Limitations Questionnaire, and work absenteeism. Analyses included comparing the experimental and control groups on study variables, and the intervention group before and after intervention. There were no significant differences in health variables; however, the intervention group had significantly less absences, a 3% increase in work productivity scores, and significant improvement in functional reach compared with the control group. The researchers concluded that Tai Chi is an effective wellness option in the workplace. Finally, Speroni and colleagues[24] conducted a 2 group quasi-experimental design study on the effect of the Nursing Living Fit program on BMI. Participants were recruited from 7 hospitals in 3 Mid-Atlantic States with 108 nurses self-selecting to participate in the exercise and nutrition program and 109 serving as the control. Outcome measures were provided by 126 nurses. Body mass index measures were obtained at baseline, week 12 (postintervention), and week 24. While there was a significant decrease in BMI in the intervention group at week 12, this effect was not found at week 24. The researchers concluded that the Living Fit program is effective in supporting nurse health; however, the program must be ongoing to maintain positive effect.

Eight studies were designed primarily to improve the mental health of nurses. Of these, 3 used specific educational programs, including teaching cognitive-based therapy (CBT), mindfulness training, or a psychoeducational program to reduce nurse stress and/or burnout. Brunero et al[13] provided an 8-hour workshop to teach CBT to 18 new graduate nurses in an Australian hospital. A pretest, posttest survey design was used. There was a significant decrease in stress scores as measured by the Nurse Stress Scale (NSS) postintervention suggesting that CBT can assist nurses with reducing stress. Mackenzie et al[18] used a 2-group quasi-experimental design to evaluate the effect of mindfulness training on burnout symptoms, relaxation and life satisfaction in a Canadian hospital. There were 18 registered nurses in the sample of 30. The researchers found no significant decreases in outcome measures after the 4-week intervention; however, they noted statistical trends in the right direction supporting the potential use of mindfulness training to decrease stress.

Two studies were designed to improve general mental health and well-being. Koivu et al[16] conducted a quasi-experimental study at a Finnish Hospital. The purpose of the study was to examine the effectiveness of a 4-year clinical supervision program on nurse well-being and health outcomes. One hundred and nineteen nurses participated in the clinical supervision group and 82 were in the control group. There were no significant differences in perceptions of health; however, there were significant decreases in professional inefficacy and psychological distress scores in the treatment group. Finally, a study by Richards and colleagues[22] used a qualitative design to determine the experiences of 24 nurses who participated in spirituality-based intervention to reduce stress and improve nursing care. One on one interviews were conducted after participants took part in the 8-point program, which is designed to provide spirituality-

based self-management tools. Analysis of transcripts determined that participants had an increased ability to focus and better emotional balance.

Two studies were designed to improve sleep and alertness or improve the management of grief. Keene and colleagues[15] at Johns Hopkins Children's Hospital administered surveys to 676 health care workers, of which 373 were registered nurses, after they participated in the debriefing program to manage grief. The survey instrument was designed by the researchers and included Likert-scale questions that measured their satisfaction with the program as well as their ability to manage grief and maintain professional integrity. Participants who participated in the debriefing sessions had significantly improved scores in their ability to handle grief and maintain their professional integrity than those participants who did not participate in debriefing sessions. Finally, Scott and colleagues[23] utilized a pretest posttest repeated-measures design to determine the effect of a fatigue counter-measures program on nurse sleepiness and sleep quality. The sample included 37 nurses employed full-time on medical-surgical units. Significant improvements in sleep duration, quality, and alertness were found at 4-weeks and 12-weeks after intervention; however, there were no significant improvements in daytime sleepiness scores. Interestingly, many of the participants felt guilt from participating in the study as "short naps" and frequent breaks were included in the program. The researchers concluded that fatigue counter-measure programs may be beneficial in improving nurse sleep, ultimately improving safety of patient care.

RECOMMENDATIONS FOR FUTURE RESEARCH

This synthesis of the literature demonstrates that while there is research on the specific health problems of nurses there is still a paucity of published research on interventions and evidence-based strategies to improve nurse health. Almost half of the studies were conducted outside of the United States and only half used an experimental design. This lack of research may be due to the fact that nurses tend to focus on everyone else before themselves. In addition, there were few common themes in the 18 identified studies in terms of interventions applied or outcome measures used. However, the evidence we have suggests that on-site wellness and exercise programs, including Tai Chi, and formal health and fitness programs, are effective in improving nurse fitness and decreasing body fat. Ergonomic training programs can prevent injury in nurses. Massage and physiotherapy have been found to be effective for reducing back pain. Programs designed to improve mental health, including the teaching of CBT, grief debriefing, and spirituality programs may decrease stress, improve grief response, and decrease feelings of burnout and emotional exhaustion. The study reporting on a clinical supervision program to improve health that was conducted in Finland may be more difficult to translate into practice in the United States due to the differences in health care models. Most US nurses receive clinical supervision. Finally, while evidence on the impact of lifting programs to decrease injury was mixed, it seems obvious that reducing the lifting burden on nurses would decrease musculoskeletal injury and pain.

Of interest, while this literature search included studies that were published between 2000 and 2012, all the studies in this review were published between 2006 and 2012. This may demonstrate that nurse health is being given increased attention and research is just starting. Another possible reason for so few published articles is that interventions and programs that may be going on within institutions are not being published in the literature. It is critical that nurses be encouraged to publish their projects and research studies, no matter how small, so a body of evidence can grow.

In conclusion, the health problems of nurses have been described extensively in the literature. However, describing a problem does not necessarily lead to "fixing" a problem. Historically, there has been little funding to study nurse health, potentially contributing to the lack of research specific to improving nurse health. This review demonstrates the critical need for research studies specifically designed to improve the health and safety of the nursing workforce. While some of the studies found in this review offer promise for improving nurse health, including nutrition and physical fitness programs, debriefing sessions, counter fatigue programs, holistic practices such as Reiki, massage, or Tai Chi, more studies are needed with larger sample sizes utilizing diverse methods. With the aging of the nurse workforce, it is critical that more funding be given to researching evidence-based strategies for improving the safety of work environments and improving the health of nurses. It is time for nurses to advocate not only for their patients but also for themselves.

REFERENCES

1. US Department of Labor. Occupational outlook handbook, 2012–2013 edition, registered nurses. http://www.bls.gov/ooh/healthcare/registered-nurses.htm. Published 2012. Accessed October 13, 2012.

2. Lucian Leape Institute. Through the Eyes of the Workforce: Creating Joy, Meaning, and Safer Healthcare. Boston, MA: National Patient Safety Foundation; 2013.

3. Institute of Medicine of the National Academies. The future of nursing: leading change, advancing health. http://www.iom.edu/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health.aspx. Published October 5, 2010. Accessed March 27, 2013.

4. Palmer D. To help a million sick you must kill a few nurses: nurses occupational health, 1890–1914. Nurs His Rev. 2012;20:14–45.

5. Fronteira I, Ferrinho P. Do nurses have a different physical health profile? A systematic review of experimental and observational studies on nurses' physical health. J Clin Nurs. 2011;20:2404–2424.

6. Schultz AB, Chen C-Y, Edington DW. The cost and impact of health conditions on presenteeism to employers: a review of the literature. Pharmacoeconomics. 2009;27(5):365–

378.

7. Letvak S, Ruhm C, Gupta S. Nurses' presenteeism and its effect on self-reported quality of care and costs. Am J Nurs. 2012;112(2):30–38.

8. Geiger-Brown JL, Lipscomb J. The health care work environment and adverse health and safety consequences for nurses. Annu Rev Nurs Res. 2010;28:191–231.

9. Ricci JA, Stewart WF, Chee E, Leotta C, Foley K, Hochberg MC. Back pain exacerbations and lost productive time costs in United States workers. Spine. 2006;31(26):3052–3060.

10. Office of Applied Statistics, US Department of Health and Human Services. Results from the 2006 national survey on drug use and health: national findings. Rockville, MD: Substance Abuse and Mental Health Services Administration; 2006.

11. Jacob IG. Depressions impact on safety. Occup Health Saf. 2006;75(10):32–40.

12. Channing Laboratory. Nurses' Health Study Web site. 2012. http://www.channing.harvard.edu/nhs/. Accessed October 15, 2012.

13. Brunero S, Cowan D, Fairbrother G. Reducing emotional distress in nurses using cognitive behavioral therapy: a preliminary program evaluation. Jap J Nurs Stud. 2008;5:109–115.

14. Diaz-Rodriguez L, Arroyo-Morales M, Cantarero-Villaneuva I, Fernandez-Lao C, Polley M, Fernandez-de-las-Penas C. The application of Reiki in nurses diagnosed with Burnout Syndrome has beneficial effects on concentration of salivary IgA and blood pressure. Rev Lat Am Enfermagem. 2011;19(5):1132–1138.

15. Keene EA, Hutton N, Hall B, Rushton C. Bereavement debriefing sessions: an intervention to support health care professionals in managing their grief after the death of a patient. Ped Nurs. 2010;36(4):185–189.

16. Koivu A, Saarinen PI, Hyrkas K. Does clinical supervision promote medical-surgical nurses' well being at work? A quasi-experimental 4-year follow-up study. J Clin Nurs Manage. 2012;20:401–413.

17. Kravits K, McAllister-Black R, Grant M, Kirk C. Self-care strategies for nurses: a psycho-educational intervention for stress. Appl Nurs Res. 2010;23(3):130–138.

18. Mackenzie CS, Poulin PA, Seidman-Carlson R. A brief mindfulness-based stress reduction intervention for nurses and nurse aides. App Nurs Res. 2006;19:105–109.

19. Martin PH. Effect of a nurse back injury prevention intervention on the rate of injury

compensation claims. J Saf Res. 2009;40:13–19.

20. Meeks-Sjostrom D, Lopuszynski SA, Bairan A. The wisdom of retaining experienced nurses at the bedside: a pilot study examining minimal lift program and its impact on reducing patient movement related injuries to the bedside nurse. Medsurg Nurs. 2010;19(4):233–236.

21. Palumbo MV, Wu G, Shaner-McRae H, Rambur B, McIntosh B. Tai chi for older nurses: a workplace wellness pilot study. Appl Nurs Res. 2012;25:54–59.

22. Richards TA, Oman D, Hedberg J, Thoresen CE, Bowden J. A qualitative examination of a spiritually-based intervention and self-management in the workplace. Nurs Sci Q. 2006;19(3):231–239.

23. Scott LD, Hofmeister N, Rogness N, Rogers AE. An interventional approach for patient and nurse safety: a fatigue countermeasures feasibility study. Nur Res. 2010;59(4):250–258.

24. Speroni KG, Earley C, Seibert D, et al. Effect of nurses Living Fit exercise and nutrition intervention on body mass index in nurses. J Nurs Adm. 2012;42(4):231–238.

25. Springer PJ, Lind BK, Kratt J, Baker E, Clavelle JT. Preventing employee injury. AAOHN J. 2009;57(4):143–148.

26. Tucker SJ, Lanningham-Foster LM, Murphy JN, et al. Effects of a worksite physical activity intervention for hospital nurses who are working mothers. AAOHN J. 2011;59(9):377–386.

27. Yuan SC, Chou MC, Hwu LJ, Chang YO, Hsu WH, Kuo HW. An intervention program to promote health related physical fitness in nurses. J Clin Nurs. 2009;18:1404–1411.

28. Schernhammer ES, Kroenke CH, Laden F, Hankinson SE. Night work and the risk of breast cancer. Ann Epidemiol. 2004;14(1):24–30.

29. Feskanich D, Hankinson SE, Schernhammer ES. Nightshift work and fracture risk: the Nurses' Health Study. Epidemiology. 2006;17(1):108–111.

30. Whittemore R, Knafl K. The integrative review: updated methodology. J Adv Nurs. 2005;52(5):546–553.

31. Borges TP, Greve JMDA, Monteiro AP, daSilva RES, Gioyani AMM, daSilva MJP. Massage application for occupational low back pain in nursing. Rev Lat Am Enfermagem. 2012;20(3):511–519.

32. Jaromi M, Nemeth A, Kranicz J, Laczko T, Betlehem J. Treatment and ergonomics training of work-related lower back pain and body posture problems for nurses. J Clin Nurs.

2012;21:1776–1784.

33. Nelson A, Matz M, Fangfei C, Siddharthan K, Lloyd J, Fragala G. Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. Int J Nurs Stud. 2006;43:717–733.