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Nurses and health-promoting self-care: Do we practice what we preach?

Alyson Ross, PhD, RN[1], **Li Yang, MS**[1], **Leslie Wehrlen, MSN, RN**[1], **Avery Perez, BS**[1], **Nicole Farmer, MD**[1], and **Margaret Bevans, PhD, RN, FAAN**[2]

[1]National Institutes of Health Clinical Center, Nursing Department, Research and Translational Science, Bethesda, MD

[2]National Institutes of Health Office of Research on Women's Health

Abstract

AIMS: To examine the health-promoting behaviors performed by registered nurses (RNs), as well as workplace factors that influence participation in those behaviors.

Background: Nurses have high levels of overweight/obesity and may not be engaging in health-promoting self-care.

Methods: A cross-sectional web-based survey collected information from 335 RNs regarding their physical activity, sedentariness, and fruit/vegetable consumption.

Results: More than half were overweight (34.1%) or obese (23.4%), and 80.1% were "sedentary" (≥ 3 hours sitting/day), particularly those working outside of direct patient care in management, research and education. Only 47.2% consumed 5+ servings of fruits/vegetables daily. Nurses who enjoyed their jobs (higher levels of compassion satisfaction) reported higher levels of physical activity ($p = 0.03$) and fruit/vegetable consumption ($p = 0.02$).

Conclusion: RNs who work outside of direct patient care might be at increased risk for sedentariness and obesity. RNs who enjoy their jobs may experience less stress and have more energy to exercise and to prepare/consume healthy meals.

Implications for Nursing Management: Nurse Managers should practice self-care by engaging in exercise, proper nutrition, and demonstrating work-life balance, both to protect their own health and to serve as role models for RNs in direct patient care.

Keywords

Workforce health; physical activity; nutrition; obesity; sedentariness

Introduction

Despite having knowledge of the importance of health-promoting behaviors, nurses have high levels of overweight and obesity (Bogossian et al., 2012; Kelly & Wills, 2018; Kyle,

Corresponding author Alyson.ross@nih.gov.

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Neall, & Atherton, 2016). While the reasons underlying the high levels of obesity and overweight in nurses are complex, stress and shift work appear to play pivotal roles (Buss, 2012; Kelly & Wills, 2018). There is evidence that nurses experience workplace stress that may impact their health, but most of this research has focused on the impact of workplace stress on sleep and health-risk behaviors such as smoking (Bae & Fabry, 2014; Duaso, Bakhshi, Mujika, Purssell, & While, 2017). Health-promoting behaviors that ameliorate the impact of stress on physical and mental health such as exercising and eating a healthy diet have been studied less frequently (Chan & Perry, 2012). Yet engaging in regular physical activity reduces one's risk of all-cause mortality by 33% (Nocon, Hiemann, Muller-Riemenschneider, Thalau, Roll, & Willich, 2008). Diet also has a profound impact on health, as fruit/vegetable consumption has been linked with decreased all-cause mortality (Sala-Vila, Estruch, & Ros, 2015). The purpose of this study was to examine the frequency and amount of physical activity and fruit/vegetable consumption in registered nurses (RNs), as well as workplace factors that predict those health-promoting behaviors.

Problem and Significance

Nurses who consume nutrient-poor diets and participate in low levels of physical activity are at increased risk for chronic health problems (Vieira, Kumar, & Narayan, 2008; Torquati, Pavey, Kolbe-Alexander, & Leveritt, 2017). An unhealthy workforce results in increased absences and "presenteeism," defined as being at work but not functioning at full capacity, potentially disrupting patient care and increasing the workload for the remaining staff (Letvak, 2013; While, 2015). Health professionals who were normal weight were more likely to provide weight loss advice than were overweight health professionals (Zhu, Norman, & While, 2011). Likewise, nurses who frequently exercised were more likely to promote physical activity with their patients (Bakhshi, Sun, Murrells, & While, 2015). Thus, nurses who engage in health-promoting self-care may be better role models and advocates for health promotion than nurses who do not.

Background

The American Heart Association (AHA) recommends a minimum of 150 minutes of moderate (or 75 minutes of intense) physical activity per week and eating a diet that includes at least five servings of vegetables and/or fruits per day (AHA, 2018), yet nurses may not be following these guidelines. While nursing may appear to be physically demanding, the occupational physical activity levels of nurses providing patient care are largely low intensity (Chappel, Verswijveren, Aisbett, Considine, & Ridgers, 2017). In a systematic review, more than 70% of U.S. nurses surveyed did not adhere to AHA guidelines for physical activity (Priano, Hong, & Chen, 2018). Sixty-three percent of 120 Midwestern U.S. nurses consumed fewer than five fruits/vegetables per day (Jordan, Khubchandani, & Wiblishauser, 2016). Similarly, 71.2% of Brazilian nurses did not consume the recommended servings of fruits/vegetables (Hidalgo et al., 2016), and only 8% of Australian nurses consumed their country's recommended five servings of vegetables and two servings of fruit (Perry, Gallagher, Nicholls, Sibbritt, & Duffield, 2018).

According to Pender's model, individuals possess personal characteristics and encounter situational experiences, in this case workplace factors, which influence their participation in

health-promoting activities (Pender, Murdaugh, & Parsons, 2011). Personal characteristics such as body mass index (BMI) or age may influence health behaviors. Nurses with higher BMIs reported consuming less healthy diets than nurses with lower BMIs (Beebe, Chang, Kress, & Mattfeldt-Beman, 2017). There is conflicting evidence regarding age, as increasing age has been associated with increases as well as decreases in health-promoting behaviors (Thacker, Stavarski, Brancato, Flay, & Greenawald, 2016, Kurnat-Thoma, El-Banna, Oakcrum, & Tyroler, 2017; McCarthy, Wills, & Crowley, 2018; Perry, Gallagher, Nicholls, Sibbritt, & Duffield, 2018).

Workplace factors such as a nurses' job type also may influence whether nurses engage in health-promoting activities. For example, medical-surgical and telemetry nurses reported participating in more health-promoting behaviors than did critical care nurses (McElligott, Siemers, Thomas, & Kohn, 2009). Staff nurses reported participating in fewer health-promoting behaviors than did nurse managers (Thacker et al., 2016). Nurses' professional quality of life may impact health-promoting behaviors; nurses who enjoyed their work, measured as higher compassion satisfaction scores, participated in more health promoting-behaviors, while those with higher levels of burnout participated in fewer (Neville & Cole, 2013).

Shift work is necessary in jobs needing 24-hour/day coverage, as typically is the case for nurses providing direct care to patients at the bedside. Nurses working shifts, particularly night shifts; rotating shifts that vary between days, evenings, and/or nights; and/or long hours may experience negative health effects such as obesity and disturbances in sleep, mood, and digestion (Caruso, 2014). Less well studied is the impact of these workplace factors on participation in health-promoting activities.

Research regarding workplace factors that contribute to health-promoting behaviors in nurses has been limited. While research has examined the relationship between unfavorable work schedules such as long hours, night shifts and/or variable shifts with stress, obesity and sleep (Caruso, 2014; Han, Trinkoff, Storr, Geiger-Brown, Johnson, & Park, 2012), these studies did not examine whether unfavorable schedules contribute to nurses' own participation in health-promoting behaviors. No published studies have examined how much nurses sit during the work day. Such research is warranted, because individuals who are "sedentary," sitting three or more hours per day, are at increased risk of all-cause mortality, even if those individuals otherwise participate in moderate or high levels of exercise (Rezende, Sa, Mielke, Viscondi, Rey-Lopez, & Garcia, 2016). Finally, health behavior research often focuses exclusively on direct care nurses or pools together different types of nurses when examining outcomes. This is problematic because there may be differences in health-promoting behaviors practiced by RNs in direct patient care (DCRNs) at the bedside compared with RNs working outside of direct patient care (non-DCRNs) that should be examined.

Research Questions

Specific research questions include:

1. With what frequency do RNs participate in physical activity/sedentariness and consume fruits and vegetables?
2. What factors contribute to RNs' participation in physical activity/sedentariness and consumption of fruits and vegetables?
3. Are there differences in health outcomes (BMI, alcohol consumption, and smoking) and health-promoting behaviors (physical activity/sedentariness and consumption of fruits and vegetables) in DCRNs compared with non-DCRNs?

Methods

Study Design

A cross-sectional survey design collected information about health-promoting behaviors in RNs at the NIH Clinical Center. This study was approved by the Office of Human Subjects Research Protections at the NIH Clinical Center. Consent was implied if participants accessed the link and completed the survey.

Study Population

This study took place during a three week period in November, 2016 at the NIH Clinical Center, a facility devoted to clinical research, with approximately 1,600 active clinical research studies. The facility, located in the state of Maryland, United States of America, has 200 inpatient beds, 15 outpatient clinics and 93 day hospital stations that support over 100,000 outpatient visits and 5,200 inpatients annually (DHHS, 2017). Most clinical studies conducted at the NIH Clinical Center arise from the NIH Clinical Center laboratory and basic bench research that is then directly translated into first-in-human, Phase I and II clinical trials. The NIH Clinical Center has primarily an all-RN staff, with the majority of RNs holding a bachelor's degree or higher. Like other hospitals, RNs provide direct patient care at the bedside to critically ill and high acuity patients on a variety of units including medical-surgical, intensive care, pediatrics, behavioral health, and substance abuse. However, unlike many hospitals where the large majority of RNs work at the bedside in direct patient care, the NIH Clinical Center has a large percentage of RNs who work outside of direct patient care in research, administration, education and advanced-practice. While past studies have examined health behaviors in hospital RNs, the large number of nurses working outside of direct patient care at the NIH Clinical Center provides a unique opportunity to directly compare health-promoting behaviors in two distinct types of nurses, DCRNs and non-DCRNs.

Recruitment and Survey Procedure

All RNs at the NIH Clinical Center (N = 1363) were eligible. RNs were invited to participate via three emails. The first contained a letter from the Principal Investigator (PI) with a description of the study and a link to an anonymous online survey. One week after the initial email, a reminder email was sent, followed a week later by a final reminder. The survey site was kept open for one week after the final email was sent. All emails contained the contact information for the PI and an explanation that the survey was voluntary.

Measures

Demographic Characteristics.—Demographics included: age, sex, race, ethnicity, education, marital status, smoking status (smoker, non-smoker [including never smoked and previously smoked but now a non-smoker]), alcohol consumption (number of drinks [12 ounces/355 ml of beer, 4 ounces/118 ml of wine, 1.5 ounces/45 ml of hard liquor/spirits] per day), height (in inches), and weight (in pounds). BMI was calculated [weight (pounds) / height (inches)^2] × 703 (National Heart, Lung and Blood Institute, 1998).

Workplace Factors.—Workplace information included: years of nursing practice, employment status (full time/part time), job type (staff nurse; research nurse; "leadership" nurse, a term used at the NIH Clinical Center that includes administrators, scientists, and educators; and advanced-practice nurses [clinical nurse specialists/nurse practitioners]), service status (government/civilian or Public Health Service [PHS]), shifts worked (days, evenings, nights, or rotating/variable), and shift length (<12 hours, ≥12 hours). The nursing questions were based upon the survey used in the Nurses' Worklife and Health Study, a three-part research program examining the impact of nurses' work environment (job demands, work schedules, and staffing) on nurses' health, funded by the National Institute of Occupational Safety and Health and the National Institute on Drug Abuse from 1993–2006 (Trinkoff, Geiger-Brown, Brady, Lipscomb, & Muntaner, 2006).

Professional quality of life (ProQol) was measured using ProQol Version 5, composed of three 10-item subscales scored on a 5-point Likert scale (1 = never to 5 = very often) (Stamm, 2010); compassion satisfaction captures positive affect/pleasure associated with work; burnout measures the mental and physical wear of workplace tension/stress; and secondary traumatic stress measures work-related trauma. Each scale produces a t-score with a mean of 50 (SD 10). Higher scores indicate more of the subscale. Over 200 papers have demonstrated ProQOL to have good construct validity and internal reliability (Chronbach's α for subscales = .75-.88) (Stamm, 2010). Cronbach's α coefficients in this study were compassion satisfaction (.92), burnout (.73), and secondary trauma (.78).

Physical Activity.—The 4-item International Physical Activity Questionnaire short form (IPAQ-SF) assesses amounts of vigorous activity, moderate activity, walking, and sitting within the past seven days (Craig et al., 2003). Answers are used to calculate a total score for MET-minutes per week of physical activity and sedentariness, defined as sitting for more than three hours/day (Rezende et al., 2016). The IPAQ was extensively tested in twelve countries, yielding good test-retest reliability (Spearman's correlation = .8) and fair to good criterion validity compared with accelerometry (Craig et al., 2003).

Fruit and Vegetable Consumption.—Servings/day of fruits and vegetables were calculated using the 7-item fruit and vegetable subscale from the National Cancer Institute's (NCI) Multifactor Screener, which collects frequency of fruits (fruit and juice) and vegetables (excluding fried potatoes) consumed during the past month. Responses range from never to several times per day (Thompson, Midthune, Subar, Kahle, Schatzkin, & Kipnis, 2004). This questionnaire was validated against multiple 24-hour recall questionnaires in NCI's Observing Protein and Energy (OPEN) study and Eating at

America's Table Study (EATS), and it had strong criterion validity compared with true consumption of fruits and vegetables (.5 to .8) (Thompson et al., 2004).

Statistical Analyses

Descriptive statistics (mean and standard deviation for normally distributed continuous data, median for ordinal and non-normally distributed continuous data, frequencies and percentages for nominal data) were used to describe the sample and to answer research question one. Question two was answered using linear and logistic regression models; first, correlations matrices, parametric (t test and ANOVA) and non-parametric tests (Wilcoxin rank sum and Kruskal-Wallis) were used to examine the relationships between the demographic and workplace factors with the health-promoting behaviors. Factors with $P < 0.10$ were entered into regression models to assess the relationships between those factors and health-promoting behaviors. Variables in the final models were selected using backward elimination with removal criteria of 0.10. Variables that were dichotomized due to unequal distributions included: race (white/non-white), marital status (married or partnered/ unmarried), type of shifts worked (nights/other shifts and variable/not variable) hours worked (≥12 hours/ <12 hours), and job type (DCRN/non-DCRN). For research question three, health factors (smoking status, alcohol consumption, and BMI) and health-promoting behaviors were compared between DCRNs and non-DCRNs using appropriate parametric (t test) and non-parametric tests (Wilcoxin rank sum and Chi-square). Data analyses were conducted using IBM SPSS 25. $P < 0.05$ was considered significant.

Results

Personal, Workplace, and Health Characteristics.

Of 1362 RNs who received the survey, 335 (24.6%) accessed the link and participated in the survey (Table 1). RNs in this study were on average 46.7 ± 10.8 years old and had practiced nursing for many years (m = 19.2 ± 11.4 years). The majority worked full time (87.1%) and exclusively worked the day shift (70.7%). A minority worked "unfavorable" shifts including: variable shifts (22.3%), night shifts (13.6%), and long shifts of 12 or more hours (20.1%).

Health characteristics of respondents are shown in Table 2. The mean BMI was 27.3 ± 6.2, and more than half were overweight (34.1%) or obese (23.4%). The majority (60.8%) consumed some alcohol; those who drank consumed 0.71 ± 0.61 drinks/day (range = 0–4).

Health Promoting Behaviors.

The majority reported moderate (35.2%) or high (37.5%) physical activity levels. Subjects reported sitting a median of 6.0 hours per day, with most (80.1%) considered "sedentary." Participants reported a median of 4.8 servings of fruits and vegetables per day, with 47.2% consuming the recommended 5+ servings per day.

Predictors of Health-Promoting Behaviors.

Final models with predictors of health-promoting behaviors are shown in Table 3. Compassion satisfaction was the only workplace factor that predicted fruit/vegetable

consumption and physical activity. Higher compassion satisfaction scores predicted higher physical activity level (p = 0.03) and more fruit/vegetable consumptions (p = 0.02). Both the number of hours worked (<12/day vs. 12+/day) and job type (DCRNs vs. non-DCRNs) predicted sedentariness. Controlling for race and BMI, RNs who worked 12+ hours per day had about 43% lower odds of being sedentary than RNs who worked <12 hours per day (OR = 0.43; 95% CI = 0.19 – 0.98, p = 0.04), and DCRNs had about 21% lower odds of being sedentary than non-DCRNs (OR = 0.21; 95% CI = 0.09 – 0.49, $P < 0.0001$).

Differences between DCRNs and non-DCRNs.

Demographic and health characteristics of DCRNs and non-DCRNs, along with significant differences between the two groups, are shown in tables 1 and 2. DCRNs had significantly lower BMI's ($P = 0.04$) and sat an average of 2.3 fewer hours per day than non-DCRNs ($P < 0.001$).

Discussion

In examining the health and health-promoting behaviors of RNs at the NIH Clinical Center, the majority reported moderate to high levels of physical activity, and their participation in health risk behaviors such as smoking and excessive alcohol consumption was low. They reported higher fruit/vegetable consumption than nurses in the Midwestern U.S. and Brazil (Hidalgo et al., 2016; Jordan et al., 2016). The NIH Clinical Center is located in Maryland, a state with relatively high consumption of fruits/vegetables where the majority of residents (52.9%) meet AHA guidelines for physical activity (AHA, 2018). Nearly 8% of participants were in the PHS, which has mandatory fitness requirements. Thus, it is not surprising that this highly educated, all-RN staff reported relatively high frequencies of exercise. Despite this, more than half did not meet AHA requirements for fruit/vegetable consumption, and more than half were overweight or obese, with rates similar to those found in the general population (CDC, 2018) and in other populations of nurses (Bogossian et al., 2012).

Among the more interesting findings of this study were the workplace factors that contributed to participation in health-promoting behaviors. Past studies have found that working unfavorable shifts such as night shift, rotating shifts, and/or long hours contribute to poor health outcomes in nurses (Caruso, 2014). Yet none of these factors contributed to physical activity or fruit/vegetable consumption in this study. Indeed, working long hours and/or in direct patient care was somewhat protective, as RNs who worked ≥12 hours/day or in direct patient care were less sedentary than those working <12 hours or in leadership positions. Perhaps most importantly, the amount of satisfaction that RNs derive from their job had a bigger influence than other workplace factors on physical activity and fruit/vegetable consumption, confirming similar findings of Neville and Cole (2013).

In examining differences between DCRNs and non-DCRNs, their rates of physical activity and nutritional intakes were similar, but their rates of sedentariness and obesity were significantly different. The non-DCRNs were sitting an average of two hours per day more than DCRNs, possibly explaining their higher rates of overweight and obesity. Because sitting more than three hours a day is associated with increased all-cause mortality (Rezende et al., 2016), nearly all of the nurses in this study were at increased mortality risk due to high

levels of sitting, even those who were otherwise exercising at moderate or high levels. However, non-DCRNs were at higher risk.

High calorie/nutrient-poor diets and physical inactivity are considered the primary culprits of obesity, but another factor that contributes to obesity is stress. Stress can lead to binging on alcohol and increased consumption of foods high in fat, sugar and salt, while chronic stress is associated with increased abdominal adiposity, weight gain, and obesity (Sinha & Jastreboff, 2013). Nursing is a stressful occupation, and past studies have shown a positive relationship between stressful work conditions and obesity in nurses (Caruso, 2014). Conversely, higher levels of compassion satisfaction are associated with lower levels of stress in nurses (Hegney et al., 2014). Perhaps this explains why increasing compassion satisfaction might improve nurses' participation in health-promoting behaviors; nurses who are happier and less stressed may have fewer food cravings and more energy to exercise. Regardless, if the stress of the nursing workplace is contributing to increased levels of overweight and obesity, then attempts at weight loss that ignore stress levels and do not include a component of stress management may be ineffective.

Implications for Nursing Management

Nurse managers have a vested interest in promoting and fostering wellness and self-care in their employees, as such activities will increase nurses' resiliency and may directly impact clinical care. Indeed, unhealthy nurses have more absences and are less likely to be able to work at full capacity, potentially increasing the workload for other nurses on the unit (Letvak, 2013; While, 2015). Thus, encouraging self-care in DCRNs may not only benefit the individual RNs, but it may have an impact on the entire unit.

This study provides evidence that nurse managers may themselves be at increased risk for sedentariness and obesity. Perhaps one of the most important first steps that managers can take to improve the health of their workforce is to reflect on their own patterns of activity, diet, and professional quality of life in order to better serve as role models for healthy living. Nurse leaders can maintain their own health by exercising, packing nutritious meals/snacks, and demonstrating a healthy work-life balance, thereby leading by example. Managers might initiate walking or standing meetings. Using standing desks can be effective at reducing workplace sedentariness, although they do not impact levels of physical activity and sedentariness outside of work (MacEwen, Saunders, MacDonald, & Burr, 2017). Managers who encourage self-care in their staff, then bring in sugar-laden treats, eat lunch at their desk, work long hours with few breaks, and send emails late at night or while on vacation are sending mixed messages. By prioritizing their own health and well-being, nurse leaders are giving their staff permission to engage in their own self-care.

Limitations

This study utilized an anonymous online survey that relied on self-reports versus objective data, presenting the risk of deception, recall and response bias. It did not collect in-depth information about diet composition and/or the number of calories consumed. It is possible that the RNs over-estimated their levels of physical activity. The survey did not distinguish between occupational activity, and physical activity/exercise performed outside of work.

This study included only RNs from the NIH Clinical Center, a unique research-only hospital with a highly educated, nearly all-RN nursing staff. Thus, the findings might not be generalizable to other nursing practice environments with more diverse mixes of nurses, nursing assistants, and technicians. Despite these limitations, this study provided insights into nurses' engagement in health-promoting self-care behaviors, and it raises important issues about workplace factors that may impact nurses' health.

Conclusion

Given the important role of nurses in health promotion and disease prevention, identifying factors that influence participation in health-promoting self-care in nurses is important. Despite high levels of physical activity, these RNs, particularly those in leadership positions, reported high levels of overweight/obesity and sedentariness. RNs who enjoy and derive pleasure from their jobs reported higher levels of physical activity and fruit/vegetable consumption. It is important for nurse managers to practice their own self-care by engaging in exercise, proper nutrition, and demonstrating work-life balance, both for the sake of their own health and to be role-models for their staff.

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References

American Heart Association (AHA) (2015). The American Heart Association's Diet and Lifestyle Recommendations. Retrieved from http://www.heart.org/HEARTORG/HealthyLiving/HealthyEating/Nutrition/The-American-Heart-Associations-Diet-and-Lifestyle-Recommendations_UCM_305855_Article.jsp#.Wrhss4jwbIU

Bae S-H, & Fabry D (2014). Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review. Nursing Outlook, 62, 138–156. doi: 10.1016/j.outlook.2013.10.009 [PubMed: 24345613]

Bakhshi S, Sun F, Murrells T, & While A (2015). Nurses' health behaviours and physical activity-related health-promotion practices. British Journal of Community Nursing, 20 289–296 doi: 10.12968/bjcn.2015.20.6.289 [PubMed: 26043015]

Beebe D, Chang JJ, Kress K, & Mattfeldt-Beman M (2017). Diet quality and sleep quality among day and night shift nurses. Journal of Nursing Management, 25, 549–557. doi:10.1111/jonm.12492 [PubMed: 28695685]

Bogossian FE, Hepworth J, Leong GM, Flaws DF, Gibbons KS, Benefer CA, & Turner CT (2012). A cross-sectional analysis of patterns of obesity in a cohort of working nurses and midwives in Australia, New Zealand, and the United Kingdom. International Journal of Nursing Studies, 49, 727–738. doi: 10.1016/j.ijnurstu.2012.01.003 [PubMed: 22307023]

Buss J (2012). Associations between obesity and stress and shift work among nurses. Workplace Health and Safety, 60, 453–458. doi: 10.3928/21650799-20120926-66 [PubMed: 23054165]

Caruso CC (2014). Negative impacts of shiftwork and long work hours. Rehabilitation Nursing, 39, 16–25. doi:10.1002/rnj.107 [PubMed: 23780784]

Centers for Disease Control (CDC) (2018, March 20). Division of Nutrition, Physical Activity, and Obesity: Data and Statistics. Nutrition, Physical Activity, and Obesity: Data, Trends and Maps. Retrieved from https://www.cdc.gov/nccdphp/dnpao/data-trends-maps/index.html

Chan CW, & Perry L (2012). Lifestyle health promotion interventions for the nursing workforce: a systematic review. Journal of Clinical Nursing, 21, 2247–2261. doi: 10.1111/j.1365-2702.2012.04213.x [PubMed: 22788559]

Chappel SE, Verswijveren S, Aisbett B, Considine J, & Ridgers ND (2017). Nurses' occupational physical activity levels: A systematic review. International Journal of Nursing Studies, 73, 52–62. doi: 10.1016/j.ijnurstu.2017.05.006 [PubMed: 28535398]

Craig CL, Marshall AL, Sjostrom M, Bauman AE, Booth ML, Ainsworth BE, … Oja P (2003). International physical activity questionnaire: 12-country reliability and validity. Medicine & Science in Sports Exercise, 35, 1381–1395. doi:10.1249/01.mss.0000078924.61453.fb

Department of Health and Human Services (DHHS) (2017, June 10). NIH Clinical Center Facts at a Glance. Retrieved from https://www.cc.nih.gov/about/welcome/fact.html.

Duaso MJ, Bakhshi S, Mujika A, Purssell E, & While AE (2017). Nurses' smoking habits and their professional smoking cessation practices. A systematic review and meta-analysis. International Journal of Nursing Studies, 67, 3–11. doi:10.1016/j.ijnurstu.2016.10.011 [PubMed: 27880873]

Han K, Trinkoff AM, Storr CL, Geiger-Brown J, Johnson KL, & Park S (2012). Comparison of job stress and obesity in nurses with favorable and unfavorable work schedules. Journal of Occupational and Environmental Medicine, 54, 928–932. doi: 10.1097/JOM.0b013e31825b1bfc [PubMed: 22821072]

Hegney DG, Craigie M, Hemsworth D, Osseiran-Moisson R, Aoun S, Francis K, & Drury V (2014). Compassion satisfaction, compassion fatigue, anxiety, depression and stress in registered nurses in Australia: study 1 results. Journal of Nursing Management, 22, 506–518. doi: 10.1111/jonm.12160 [PubMed: 24175955]

Hidalgo KD, Mielke GI, Parra DC, Lobelo F, Simoes EJ, Gomes GO, … Hallal PC (2016). Health promoting practices and personal lifestyle behaviors of Brazilian health professionals. Biomed Central Public Health, 16, 1114. doi:10.1186/s12889-016-3778-2 [PubMed: 27776496]

Jordan TR, Khubchandani J, & Wiblishauser M (2016). The Impact of Perceived Stress and Coping Adequacy on the Health of Nurses: A Pilot Investigation. Nursing Research and Practice, 2016, 5843256. doi:10.1155/2016/5843256 [PubMed: 27882246]

Kelly M, & Wills J (2018). Systematic review: What works to address obesity in nurses? Occupational Medicine, 68, 228–238. doi:10.1093/occmed/kqy038 [PubMed: 29579241]

Kyle RG, Neall RA, & Atherton IM (2016). Prevalence of overweight and obesity among nurses in Scotland: A cross-sectional study using the Scottish Health Survey. International Journal of Nursing Studies, 53, 126–133. doi:10.1016/j.ijnurstu.2015.10.015 [PubMed: 26559483]

Kurnat-Thoma E, El-Banna M, Oakcrum M, & Tyroler J (2017). Nurses' health promoting lifestyle behaviors in a community hospital. Applied Nursing Research, 35, 77–81. doi:10.1016/j.apnr.2017.02.012 [PubMed: 28532732]

Letvak S (2013). We cannot ignore nurses' health anymore: a synthesis of the literature on evidence-based strategies to improve nurse health. Nursing Administration Quarterly, 37, 295–308. doi: 10.1097/NAQ.0b013e3182a2f99a [PubMed: 24022283]

MacEwen BT, Saunders TJ, MacDonald DJ, & Burr JF (2017). Sit-Stand Desks To Reduce Workplace Sitting Time In Office Workers With Abdominal Obesity: A Randomized Controlled Trial. Journal of Physical Activity & Health, 14, 710–715. doi:10.1123/jpah.2016-0384 [PubMed: 28513245]

Mc Carthy VJC, Wills T, & Crowley S (2018). Nurses, age, job demands and physical activity at work and at leisure: A cross-sectional study. Applied Nursing Research, 40, 116–121. doi: 10.1016/j.apnr.2018.01.010 [PubMed: 29579485]

McElligott D, Siemers S, Thomas L, & Kohn N (2009). Health promotion in nurses: is there a healthy nurse in the house? Applied Nursing Ressearch, 22, 211–215. doi:10.1016/j.apnr.2007.07.005

National Heart, Lung and Blood Institute (1998). Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults. NIH Publication No. 98–4083. Retrieved from https://www.nhlbi.nih.gov/files/docs/guidelines/ob_gdlns.pdf

Neville K, & Cole DA (2013). The relationships among health promotion behaviors, compassion fatigue, burnout, and compassion satisfaction in nurses practicing in a community medical center. Journal of Nursing Administration, 43, 348–354. doi:10.1097/NNA.0b013e3182942c23 [PubMed: 23708503]

Nocon M, Hiemann T, Muller-Riemenschneider F, Thalau F, Roll S, & Willich SN (2008). Association of physical activity with all-cause and cardiovascular mortality: a systematic review and meta-

analysis. European Journal of Cardiovascular Prevention and Rehabilitation, 15, 239–246. doi: 10.1097/HJR.0b013e3282f55e09 [PubMed: 18525377]

Pender N, Murdaugh C, & Parsons M (2011). Health Promotion in Nursing Practice (6th ed.). Boston: Pearson.

Perry L, Xu X, Gallagher R, Nicholls R, Sibbritt D, & Duffield C (2018). Lifestyle Health Behaviors of Nurses and Midwives: The 'Fit for the Future' Study. International Journal of Environonmental Research and Public Health, 15, 945.doi:10.3390/ijerph15050945

Persson M, & Martensson J (2006). Situations influencing habits in diet and exercise among nurses working night shift. Journal of Nursing Management, 14, 414–423. doi:10.1111/j.1365-2934.2006.00601.x [PubMed: 16787477]

Priano SM, Hong OS, & Chen JL (2018). Lifestyles and Health-Related Outcomes of U.S. Hospital Nurses: A Systematic Review. Nursing Outlook, 66, 66–76. doi:10.1016/j.outlook.2017.08.013 [PubMed: 29037501]

Rezende LF, Sa TH, Mielke GI, Viscondi JY, Rey-Lopez JP, & Garcia LM (2016). All-Cause Mortality Attributable to Sitting Time: Analysis of 54 Countries Worldwide. American Journal of Preventive Medicine, 51, 253–263. doi:10.1016/j.amepre.2016.01.022 [PubMed: 27017420]

Sala-Vila A, Estruch R, & Ros E (2015). New insights into the role of nutrition in CVD prevention. Current Cardiology Reports, 17, 26. doi:10.1007/s11886-015-0583-y [PubMed: 25894796]

Sinha R, & Jastreboff AM (2013). Stress as a common risk factor for obesity and addiction. Biological Psychiatry, 73, 827–835. doi: 10.1016/j.biopsych.2013.01.032. [PubMed: 23541000]

Stamm BH (2010). The Concise ProQOL Manual (2nd Ed). Pocatello, ID: ProQOL.org.

Thacker K, Stavarski DH, Brancato V, Flay C, & Greenawald D (2016). CE: Original Research: An Investigation into the Health-Promoting Lifestyle Practices of RNs. American Journal of Nursing, 116(4), 24–30. doi: 10.1097/01.NAJ.0000482141.42919.b7.

Thompson FE, Midthune D, Subar AF, Kahle LL, Schatzkin A, & Kipnis V (2004). Performance of a short tool to assess dietary intakes of fruits and vegetables, percentage energy from fat and fibre. Public Health Nutrition, 7, 1097–1105. doi:10.1079/phn2004642 [PubMed: 15548349]

Torquati L, Pavey T, Kolbe-Alexander T, & Leveritt M (2017). Promoting Diet and Physical Activity in Nurses. American Journal of Health Promotion, 31, 19–27. doi:10.4278/ajhp.141107-LIT-562 [PubMed: 26389980]

Trinkoff A, Geiger-Brown J, Brady B, Lipscomb J, & Muntaner C (2006). How long and how much are nurses now working?American Journal of Nursing, 106(4), 60–72. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/16575241

Vieira ER, Kumar S, & Narayan Y (2008). Smoking, no-exercise, overweight and low back disorder in welders and nurses. International Journal of Industrial Ergonomics, 38, 143–149. doi:10.1016/j.ergon.2006.02.001

While AE (2015). Promoting healthy behaviours - do we need to practice what we preach? London Journal of Primary Care (Abingdon), 7, 112–114. doi:10.1080/17571472.2015.1113716

Zhu D, Norman I, & While A (2011). The relationship between doctors' and nurses' own weight status and their weight management practices: a systematic review. Obesity Reviews, 12, 459–469. doi: 10.1111/j.1467-789X.2010.00821.x [PubMed: 21366835]

TABLE 1

Descriptive characteristics of participants with comparisons between direct care RNs (DCRNs) and those outside of direct patient care (non-DCRNs)[a]

Descriptive Characteristics	All Nurses	Comparisons of DCRNs and Non-DCRNs[a]		*P* Value
		DCRNs	Non-DCRNs[a]	
Characteristic	**Mean (SD) Range**	**Mean (SD) Range**	**Mean (SD) Range**	
Age in Years	46.7 (10.8) 23 – 68 n=286	43.8 (11.3) 23 – 65 n=111	48.6 (10.0) 28 – 68 n=175	< 0.001 ***
Years Nursing Practice	19.2 (11.4) 0 – 45 n=333	13.8 (10.3) 0 – 43 n=128	22.6 (10.8) 0 – 45 n=204	< 0.001 ***
Compassion Satisfaction T Score[b]	50.0 (10.0) 14 – 65 n=313	49.2 (10.2) 14 – 65 n=123	50.4 (9.9) 20 – 65 n=189	0.32
Burnout T Score[b]	50 (10) 22 – 78 n=310	49.4 (10.0) 22 – 76 n=123	50.5 (9.8) 27 – 78 n=186	0.33
Traumatic Stress T Score[b]	50.0 (10.0) 31 – 80 n=310	50.1 (10.4) 33 – 76 n=121	49.9 (9.7) 31 – 80 n=189	0.85
	n (%)	**n (%)**	**n (%)**	***P* Value**
Gender (n = 292)				0.39
Female	266 (91.1)	100 (89.3)	166 (92.2)	
Race (n=286)				< 0.001 ***
White	206 (72.0)	66 (59.5)	140 (80.0)	
Non-White[c]	80 (28.0)	45 (40.5)	35 (20.0)	
Ethnicity (n = 282)				0.92
Non-Hispanic	266 (94.7)	103 (94.5)	163 (94.8)	
Marital Status (n = 291)				0.03 *
Married/Partnered	211 (72.5)	74 (65.5)	137 (77.0)	
Divorced/Separated/Never Married/Widowed	80 (27.5)	39 (34.5)	41 (23.0)	
Education (n=291)				< 0.001 ***
Diploma/Associate's Degree	20 (6.9)	14 (12.5)	6 (3.4)	
Bachelor's Degree	151 (51.9)	80 (71.4)	71 (39.7)	

Descriptive Characteristics	All Nurses	Comparisons of DCRNs and Non-DCRNs[a]		*P* Value
		DCRNs	Non-DCRNs[a]	
Characteristic	Mean (SD) Range	Mean (SD) Range	Mean (SD) Range	
Master's Degree	107 (36.8)	17 (15.2)	90 (50.3)	
Doctoral Degree (PhD/DNP)	13 (4.5)	1 (0.9)	12 (6.7)	
Primary Position (n = 334)				< 0.001***
Staff Nurse	129 (38.6)	129 (100)	0 (0.0)	n/a
Research Nurse	102 (30.5)	0 (0.0)	102 (49.8)	n/a
Leadership Nurse[d]	65 (19.5)	0 (0.0)	65 (31.7)	n/a
Advanced Practice Nurse[e]	38 (11.4)	0 (0.0)	(18.5)	n/a
Employment Statistics				
Employment Status (n = 334)				<0.001***
Full Time	291 (87.1)	96 (74.4)	195 (95.1)	
Part Time/PRN	43 (12.9)	33 (25.6)	10 (4.9)	
Service Status (n = 330)				0.01**
Government/Civilian	304 (92.1)	124 (96.9)	180 (89.1)	
Uniformed Service/PHS	26 (7.9)	4 (3.1)	22 (10.9)	
Shifts Worked (n = 330)				< 0.001***
Days Only	236 (71.5)	56 (43.8)	180 (89.1)	
Evenings Only	6 (1.8)	6 (4.7)	0 (0.0)	
Nights Only	14 (4.2)	14 (10.9)	0 (0.0)	
Rotating/Variable	74 (22.4)	52 (40.6)	22 (10.9)	
Length of Shift Worked (n = 334)				< 0.001***
Less than 12 Hours	267 (79.9)	73 (56.6)	194 (95.1)	
12 Hours or more	67 (20.1)	56 (43.4)	10 (4.9)	
Compassion Satisfaction[b] **Category (n = 312)**				0.35
Low	1 (0.3)	1 (0.8)	0 (0.0)	
Average	160 (51.3)	66 (53.7)	94 (49.7)	
High	151 (48.4)	56 (45.5)	95 (50.3)	
Burnout[b] **Category (n = 309)**				0.44

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Descriptive Characteristics	All Nurses	Comparisons of DCRNs and Non-DCRNs[a]		*P* Value
		DCRNs	Non-DCRNs[a]	
Characteristic	Mean (SD) Range	Mean (SD) Range	Mean (SD) Range	
Low	125 (40.5)	53 (43.1)	72 (38.7)	
Average	184 (59.5)	70 (56.9)	114 (61.3)	
High	0 (0.0)	0 (0.0)	0 (0.0)	
Traumatic Stress[b] Category (n = 310)				0.49
Low	207 (66.8)	78 (64.5)	129 (68.3)	
Average	103 (33.2)	43 (35.5)	60 (31.7)	
High	0 (0.0)	0 (0.0)	0 (0.0)	

n/a, not applicable; PRN, Pro Re Nata/ As needed; PHS, Public Health Service.

[a] non-DCRNs include administrators/managers, nurse scientists, educators, research nurses and advanced practice nurses.

[b] Assessed using the Professional Quality of Life Scale (ProQol) Version 5.

[c] Non-White includes: African-American (n = 32), Asian (n = 26), “other” unspecified (n = 14), multiracial (n = 7), American Indian or Alaska native (n = 2).

[d] Leadership Nurse includes adminisrators/managers, scientists, and educators.

[e] Advanced Practice Nurse includes: nurse practitioners, clinical nurse specialists, nurse anesthetists, etc….

* $p \leq 0.05$;

** $p \leq 0.01$;

*** $p \leq 0.001$.

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TABLE 2

Health outcomes and health behaviors with comparisons between direct care RNs (DCRNs) and RNs outside of direct patient care (non-DCRNs)[a]

Health Outcome/ Health Behavior	All Nurses Mean (SD) Range	DCRNs Mean (SD) Range	Non-DCRNs[a] Mean (SD) Range	*P* Value
BMI (n=261)	27.3 (6.2) 17.4 – 54.1	26.3 (5.6) 18.6 – 43.8	27.9 (6.5) 17.4 – 54.1	0.04 *
Alcohol Drinks/Day[b]	0.4 (0.6) 0 – 4.0	0.4 (0.7) 0 – 4.0	0.4 (0.5) 0 – 2.3	0.88
	Median[c] **Range**	**Median**[c] **Range**	**Median**[c] **Range**	***P* Value**
Fruit & Vegetables/Day[d] **(n = 302)**	4.8 1.2 – 15.4	4.8 1.8 – 15.4	4.9 1.2 – 12.6	0.92
Vigorous Physical Activity Min/Week[e] **(n = 309)**	60 (0 – 750)	60 (0 – 750)	60 (0 – 450)	0.70
Moderate Physical Activity Min/Week[e] **(n = 306)**	45 (0 – 1260)	55 (0 – 450)	40 (0 – 1260)	0.59
Walking Min/Week[e] **(n =303)**	140 (0 – 1260)	140 (0 – 1260)	140 (0 – 1260)	0.92
Sedentary (sitting) Hours/Day[e] **(n = 305)**	6 0 – 18.0	4 0 – 18.0	6 0 – 18.0	< 0.001 ***
	n%	**n%**	**n%**	***P* Value**
BMI Category (n = 261)				0.12
Underweight (BMI < 18.5)	1 (0.4)	0.0 (0.0)	1 (0.6)	
Normal Weight (BMI = 18.5 – 24.9)	110 (42.1)	50 (51.0)	60 (36.8)	
Overweight (BMI=25.0 – 29.9)	89 (34.1)	30 (30.6)	59 (36.2)	
Obese (BMI ≥ 30.0)	61 (23.4)	18 (18.4)	43 (26.4)	
Smoking Status (n=317)				> 0.999
Non–Smoker[f]	311 (98.1)	122 (98.4)	189 (97.9)	
Smoker	6 (1.9)	2 (1.6)	4 (2.1)	
Physical Activity Levels[e] **(n = 304)**				0.23
Low	83 (27.3)	33 (28.0)	50 (26.9)	
Moderate	107 (35.2)	35 (29.7)	72 (38.7)	
High	114 (37.5)	50 (42.4)	64 (34.4)	

BMI, body mass index.

[a] non-DCRNs include administrators/managers, scientists, educators, research nurses, and advanced practice nurses.

[b] Drinks/Day = number of drinks (12 ounces/355 milliliters of beer, 4 ounces/188 milliliters of wine, 1.5 ounces/45 milliliters of hard liquor/spirits) consumed per day.

[c] Scoring guidelines for physical activity and fruit and vegetable consumption recommend reporting the median as opposed to the mean.

[d] Pyramid servings per day of fruits and vegetables was calculated using the National Cancer Institute's (NCI) Multifactor Screener.

[e] Physical activity and sedentariness (hours spent sitting on a typical week day) were assessed using the International Physical Activity Questionnaire, Short form (IPAQ-SF).

[f] Non-Smoker includes "never smoked" (n=248) and "previously smoked but now a non-smoker" (n=66).

* $p \leq 0.05$;

*** $p \leq 0.001$.

TABLE 3

Results of linear and logistic regression analyses with predictors of physical activity, fruit and vegetable consumption and sedentariness in RNs

		Unstandardized Coefficients			
Variables	**Predictors**	**B**	**Std. Error**	**t**	***p*-value**
Physical Activity[a]	Race[b]	5.473	2.476	2.210	0.03 *
	BMI	− .952	0.178	− 5.346	< 0.001 ***
	Compassion Satisfaction[c]	0.420	0.191	2.194	0.03 *
Fruit & Vegetables/Day[d]	BMI	− .009	0.005	− 1.812	0.07
	Marital Status[e]	0.112	0.065	1.708	0.09
	Compassion Satisfaction[c]	0.011	0.005	2.263	0.02 *
		95% Confidence Interval			
	Predictors	**Odds Ratio**	**Lower**	**Upper**	***p*-value**
Sedentariness[f]	BMI	1.113	1.026	1.207	0.01 **
	Race	1.938	0.900	4.174	0.91
	Job Type[g]	0.206	0.088	0.486	< 0.001 ***
	Long Hours[h]	0.426	0.186	0.977	0.04 *

BMI, body mass index.

[a]Physical Activity was measured using the International Physical Activity Questionnaire short form (IPAQ - SF).

[b]Race was coded as .00 = Non - white, 1 = White.

[c]Compassion Satisfaction was defined as the amount of pleasure/enjoyment one derives from one's job and was assessed using the Professional Quality of Life Scale (ProQol) Version 5.

[d]Servings per day of fruits and vegetables were calculated using the National Cancer Institute's (NCI) Multifactor Screener.

[e]Marital Status was coded as .00 = Non-Married and 1 = Married/partnered.

[f]Sedentariness was defined as sitting for three or more hours/day and was assessed using the IPAQ-SF.

[g]Job Type was dichotomized and coded as .00 = non-Direct Care RNs. (administration, management, research, education, and advanced practice) 1 = Direct Care RNs.

[h]Long work hours was coded 0 = shifts < 12 hours and 1 = shifts ≥ 12 hours.

*p ≤ 0.05;

**p≤ 0.01;

*** p≤ 0.001.