Original Research Article

Physical Activity Patterns, Satisfaction, and Quality of Life Among Nursing and non-Nursing Staff in an Office-Based Care Coordination Program

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Abstract

Introduction: Sedentary work is associated with poor health outcomes. Many healthcare occupations, including office-based care coordination, are largely sedentary. Many nurses do not achieve the recommended levels of daily physical activity, however, the physical activity levels among nurses working in care coordination are not known.

Objective: To assess the physical activity levels, self-reported health and well-being, overall quality of life, and work-related satisfaction of office-based care coordinators, and compare these among nursing and non-nursing staff.

Methods: This study collected objective physical activity data using accelerometry along with self-reported information on work-related quality of life and satisfaction from 42 healthcare staff working in a hospital-affiliated office-based care coordination program. Results were compared among nursing and non-nursing staff.

Results: Nurses had lower moderate-to-vigorous physical activity levels compared to non-nursing staff (25 min/day vs. 45, $p = .007$). There were no differences in daily sedentary time, light activity, or steps between nursing and non-nursing staff. Nurses reported high quality of life scores compared to non-nursing staff (4.4 vs. 4.1, $p = .02$), but similar levels of work-related quality of life, happiness, self-rated health, and well-being.

Conclusion: Nurses working in an office-based care coordination program had lower levels of physical activity but reported a higher overall quality of life than non-nurse work colleagues working in a similar environment. Given known health risks associated with sedentary occupational work and the growing number of care coordination programs, health policies and initiatives aimed at increasing the physical activity levels of care coordination workers is of prime importance.

Keywords

care coordination, physical activity, quality of life, nursing

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Introduction

Low levels of physical activity at a moderate or greater intensity (aka, health-enhancing physical activity) and high levels of sedentary time are well-known population health risks, leading to increased risks of poor health outcomes including cardiovascular events, diabetes, obesity, cancers, and all-cause mortality (Centers for Disease Control and Prevention, n.d.; van der Ploeg et al., 2012). Occupation sitting, a specific type of workplace-related sedentary behavior, has become increasingly prevalent in society as many types of professional and non-professional labor have shifted towards desk and computer-assisted forms of work and away from work requiring manual and ambulatory labor. Healthcare workers, including nurses, have similarly experienced trends towards increasingly sedentary work

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that has included more occupational sitting (Reed et al., 2018; Reed & Prince, 2018). Increased occupational sitting has been associated with poor health outcomes, including increased mortality (Sakaue et al., 2020), as well as, poor self-reported health (Kallings et al., 2021).

Review of the Literature

Nurses have been found to have low levels of daily physical activity (Bakhshi et al., 2015), but whether nurses have similar levels of physical activity to non-nurses in similar work roles is not clear. The Massachusetts General Hospital Integrated Care Management Program is a hospital-affiliated, office-based care coordination program (Weil et al., 2010). The program includes health care workers including nurses embedded within hospital-affiliated primary care practices providing longitudinal outpatient care coordination to high-risk complex patients. The program's nurse care coordinators spend much of their day seated at desks, using computers and telephones to assist with outpatient care coordination. Care coordination is rapidly becoming an increasingly prevalent and important nursing role for healthcare systems across the United States (American Nurses Association, 2014). To our knowledge, there are no studies assessing the physical activity and self-perceived wellness of office-based care coordination nurses. As nurses comprise the largest workforce in the hospital-affiliated care coordination program, and as a majority of the nurses' work in the program is sedentary, and as prior literature showing poor health habits—including low physical activity levels—in nurses (Bakhshi et al., 2015; Perry et al., 2018; Thacker et al., 2016), the objective of this study was to describe and compare the physical activity levels of nursing and non-nursing healthcare workers in an office-based care coordination program. In addition, given the known associations between physical activity, wellness, and mental health, we further sought to assess self-reported wellness markers, including quality of life, work-related quality of life, happiness, overall well-being, and health status.

Methods

Design

The study was initially designed as a randomized wait-list controlled trial aimed at assessing the health patterns of nurses working in the office-based care coordination program and testing the efficacy of using sit-stand workstations to decrease work-related sedentary time (MacEwen et al., 2017; Shrestha et al., 2018). Prior to installing the new workstations, to assess and quantify employee health needs, we collected baseline physical activity, work-related quality of life, and satisfaction data among program staff. Randomization occurred after completion of baseline data in February 2019, however, due to the COVID-19 pandemic and the immediate shift to work-from-home policies, we were not able to collect post-randomization data. Baseline data on physical activity and self-reported measures were analyzed and are presented in this paper as a cross-sectional study. All baseline data were collected from October 2019 to December 2019.

Research Question

The research questions for this study were: (1) how do physical activity levels compare in nursing and non-nursing healthcare workers in an office-based care coordination program, and (2) how do self-reported makers, including quality of life, work-related quality of life, happiness, overall well-being, and health status compare in nursing and non-nursing healthcare workers in an office-based care coordination program.

Sample and Setting

The Integrated Care Management Program is a hospital-affiliated office-based care coordination program within the Department of General Internal Medicine at the Massachusetts General Hospital (MGH) that assists high-need, high-cost patients followed for primary care at MGH. The goals of the Integrated Care Management Program are to provide high quality outpatient care coordination to some of the hospital's sickest patients, with a focus on reducing unnecessary emergency department use and hospitalizations, decreasing total healthcare costs, and increasing satisfaction among patients and their primary care physicians.

All 51 healthcare staff members from the Integrated Care Management Program at the Massachusetts General Hospital in Boston, Massachusetts, United States, were eligible and invited to participate in the study. Forty-two employees, including 19 nurses, nine social workers, seven community resource specialists, four administrative staff, one community health worker, one pharmacist, and the medical director chose to participate, with nine employees electing to decline participation in the study. All collected data were non-identifiable, and no demographic data were collected to maximize privacy in a voluntary work-related study.

Ethical Considerations

This research was conducted according to Helsinki recommendations and local ethical approval was obtained by the hospital's institutional review board, with all subjects providing verbal informed consent.

Measures

Physical activity: Objectively measured physical activity, including sedentary time and moderate-to-vigorous physical activity (MVPA), was measured using an Actigraph accelerometer (wGT3x-BT or GT3x, Actigraph LLC), which captures

acceleration in three planes. Participants were asked to wear the accelerometer on an elastic belt around the waist during waking hours for seven consecutive days, only removing the belt for sleep and water activities.

We collected data on several self-reported measures, including happiness, overall quality of life, work-related quality of life, health status, and well-being using a series of brief questionnaires. Study participants were directed via an internet link to complete online questionnaires using Harvard University's Electronic Data Capture (REDCap) database (Harris et al., 2009).

Happiness: Happiness was assessed using a single-item 5-point scale. Respondents were asked, "Please use the faces below to indicate how you are feeling today. The faces are numbered from 1 to 5, with 1 being the most happy and 5 being the least happy." An accompanying image was provided to respondents with five facial expressions (Figure 1). Happiness was assessed daily for one week.

Overall Quality of Life: The Brunnsviken Brief Quality of Life scale (BBQ) was used to assess self-perceived quality of life. The BBQ is a validated 12-item instrument covering six life areas: Leisure Time, View on Life, Creativity, Learning, Friends and Friendship, and View of Self, with each item answered using a 5-point scale (Lindner et al., 2016). The BBQ scale has a Cronbach alpha of 0.76 and an ICC of 0.82.

Work-Related Quality of Life: The Work-Related Quality of Life scale (WRQoL) was used to assess self-reported work satisfaction. The WRQoL is a validated 23-item, six-factor instrument that has been shown to be appropriate for use in healthcare organizations and for healthcare workers, with a Cronbach's alpha of 0.912 (Van Laar et al., 2007).

Self-rated health status: A single-item general health question was used to measure self-rated health status. Respondents were asked: "*In general, would you say your health is*:" with response options: excellent; very good; good; fair; poor (Stewart et al., 1988). Single general self-rated health questions have widely used for decades and found to predict mortality across a wide spectrum of populations and co-morbidities and to be useful as population health measure (Idler & Benyamini, 1997; Karen DeSalvo et al., n.d.).

Well-being: Cantril's ladder was used to assess self-perceived well-being, using a 10-point scale. Respondents were asked "Please imagine a ladder with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel at this time?" An accompanying image was provided to respondents. Scores below 6 indicate low self-perceived well-being, while scores above 6 are thought to represent high self-perceived well-being (Cantril, 1965) (Figure 2).

Analysis

Physical activity: Accelerometers were initialized to collect data every 60 s. As the study aimed to assess physical activity in a workforce with a high degree of occupation sitting, we used vector magnitude data, which records acceleration in three different planes to measure physical activity, thus capturing movement while standing and sitting. Standard validated adult thresholds were used to classify physical activity, with sedentary activity classified as <100 counts/min, light as 100–2019 counts/min, moderate as 2020–5998 counts/min, and vigorous as >5999 counts/min (Troiano et al., 2008). Non-wear time was defined as 60 min of consecutive zeros with a spike tolerance of 2 min. Wear times of at least 10 h/d were considered to be a valid day, and only participants who provided at least 3 weekdays and 1 weekend day of valid data were included in analyses.

Happiness: We dichotomized the happiness question responses into unhappy/happy and neutral, and then assigned each participant an overall disposition based on the mean daily value. We also calculated the mean happiness value and variance in happiness for each participant across the five days.

Work-related quality of life: We calculated work-related quality of life for each subscale, as well as the overall work-related quality of life, which was the average score per participant across all 23 questions. Subscales included: General Well Being, Home-Work Interface, Job Career Satisfaction, Control at Work, Working Conditions, and Stress at Work.

Descriptive statistics were calculated for objectively measured physical activity and all self-reported responses for all staff in the program, with each variable then also categorized by whether the participant was a registered nurse versus non-registered nurse. All other references use nursing to non-nursing staff. To test for differences in values between nursing and non-nursing staff, we ran two-sided *t*-tests

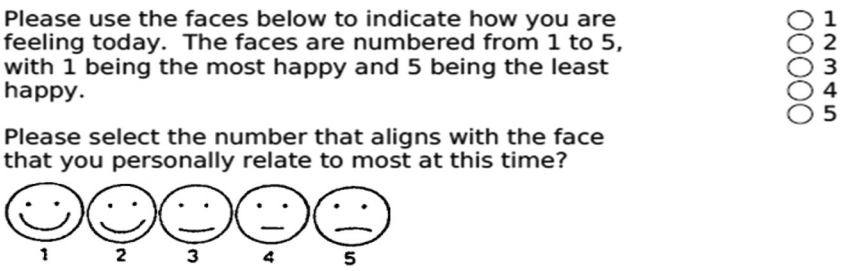

Figure 1. Happy-sad scale.

Please imagine a ladder with steps numbered from zero at the bottom to 10 at the top. The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you.

On which step of the ladder would you say you personally feel you stand at this time?

Figure 2. Self-perceived well-being scale.

comparing mean values for physical activity measures and self-reported outcomes.

Results

Table 1 provides descriptive statistics of accelerometer-obtained physical activity measures and corresponding self-reported measures among all participating staff working in the hospital's office-based care coordination program. Table 2 reports the data categorized by nursing and non-nursing staff.

Physical Activity Data

Mean daily sedentary time was 571.2 min (standard deviation, SD ± 64.0), light activity was 217.5 mins (SD ± 55.2), and MVPA was 35.0 min (SD ± 23.7) (Table 1). Mean daily step count was 8,100 (SD ± 5,996). Twenty-four healthcare staff (58.5%) met the adult guidelines of at least 150 min or more of moderate activity or at least 75 min or more of vigorous activity per week.

When comparing nursing to other non-nursing staff within the hospital program, nurses had lower mean daily levels of health-enhancing physical activity (24.6 min MVPA, standard error (SE) 3.9 vs. 44.4 min, SE 5.5, $p = .007$) (Table 2). Nursing staff had similar levels compared to non-nursing staff of mean daily sedentary time (576.5 min, SE 17.0 vs. 566.1 min, SE 12.2, $p = .6$), mean daily number of bouts of sedentary activity (17.7, SE 0.7, vs. 16.8, SE 0.6, $p = .3$), mean daily light activity (232.5 min, SE 11.6, vs. 203.3 min, SE 12.7, $p = .1$), and mean daily steps (7,874, SE 1,807 vs. 8,305, SE 821, $p = .8$).

Self-Reported Measures

Nurses reported a higher overall quality of life compared to non-nursing staff (4.4 BBQ score, SE 0.09 vs. 4.1, SE 0.08, $p = .02$), but similar levels of happiness (2.8 happy-sad score, SE 0.2 vs. 0.2, SE 0.2, $p = .5$), health-status (3.3 SF-20 score, SE 0.09 vs. 3.3, SE 0.03, $p = .8$), and well-being (7.6 Cantril Ladder score, SE 0.4 vs. 7.0, SE 0.3 SE, $p = .1$). No statistically significant differences were observed between nursing and non-nursing staff with regards to overall work-related quality of life (3.6 WRQoL score, SE 0.2 vs. 3.5, SE 0.1, $p = .4$), or on any of the work subscales (4.0 general well-being score, SE 0.1 vs. 3.7, SE 0.1, $p = .06$; 3.3 home-work interface score, SE 0.3 vs. 3.6, SE 0.1, $p = .02$; 3.8 job-career satisfaction score, SE 0.2 vs. 3.6, SE 0.1, $p = .3$; 4.0 working conditions score, SE 0.1 vs. 3.8, SE

Table 1. Daily Physical Activity Levels and Self-Reported Health and Wellbeing Scores Among Healthcare Staff in an Office-Based Care Coordination Program, $n = 42$.

Measure	Value
Sedentary time (mean daily value)	571 min
Light activity (mean daily value)	218 min
MVPA (mean daily value)	35 min
Steps (mean daily value)	8,100 steps
Happiness (mean daily score)	2.7
QOL (score)	4.2
WRQOL (average score)	3.6
Health status (score)	3.3
Well-being (score)	7.3

MVPA = moderate-to-vigorous physical activity; QOL = quality of life; WRQOL = work-related quality of life.

Table 2. Daily Physical Activity Levels and Self-Reported Health and Wellbeing Scores Among Nursing and Non-Nursing Staff in an Office-Based Care Coordination Program.

Measure	Value		*p*-value
Measure	Nurses $n = 19$	Non-nurses $n = 23$	
Sedentary time (mean daily minutes)	577	566	.6
Light activity (mean daily minutes)	232	203	.1
MVPA (mean daily minutes)	25	44	**.007***
Steps (mean daily count)	7,874	8,305	.8
Happiness (mean daily score)	2.8	2.6	.5
QOL (score)	4.4	4.1	**.02***
WRQOL (average score)	3.6	3.5	.4
Health status (score)	3.3	3.3	.8
Well-being (score)	7.7	7.0	.1

MVPA = moderate-to-vigorous physical activity; QOL = quality of life; WRQOL = work-related quality of life.
*p-value <.05.

0.1, $p = .3$; 3.2 stress at work score, SE 0.3 vs. 2.6, SE 0.2, $p = .06$).

Discussion

In this study, we report on the health habits and perceived health-related factors in employees working in a hospital-affiliated office-based care coordination program for high-risk complex patients. We found that nurses working in the program had lower levels than non-nurses of measured health-enhancing physical activity but reported a higher quality of life.

The fact that health-enhancing physical activity levels were lower among nurses and yet quality of life scores were higher, while all other markers of objective physical activity and subjective scores for health, happiness, and well-being were similar suggests that, despite working with complex patients, work environment may not be a primary driver of quality of life among nurses. Indeed, our data showed that overall well-being scores were high among nurses and that there was no statistically significant difference in career satisfaction between nurses and non-nursing staff, lending further credence to the likelihood that the factor(s) accounting for higher perceived quality of life lies outside the professional and work loci, a finding seen in nurses working across other healthcare settings (Hayes et al., 2015).

Prior studies have shown poor health habits, including physical activity, across the nursing profession (Priano et al., 2018; Reed & Prince, 2018; Ross et al., 2019). Less is known, however, about the health habits and perceived well-being of case manager nurses or other health care workers providing patient care coordination. The findings in one prior study do suggest that case manager nurses may also have poor health habits, however, this study did not differentiate between inpatient nurse case managers and office-based nurse care coordinators, terms that are often used interchangeably despite different scopes of work and work environments (Gross et al., 2019).

Strengths and Limitations

This study has several limitations. The study included health care workers from one care coordination program affiliated with a large urban academic medical center and may not be representative of healthcare workers at other smaller, non-urban, non-academic, office-based care coordinator programs. The sample size is a direct result from, and is limited by, the size of the care coordination program. While the study saw broad participation, the relatively small sample size may limit the ability to use and interpret parametric analyses. We used a single general health item to assess self-rated health (Karen DeSalvo et al., n.d.), a well-known method that has been validated and widely used for assessing self-reported health across a range of populations and countries, although, to our knowledge, this is the first study to use the instrument to assess the self-rated health status of care coordination nurses in the United States. This study did not collect information on other health habits including tobacco use, alcohol consumption, sleep patterns, or diet. Similarly, per internal review board restrictions, we did not collect data on participants' height and weight to calculate body mass index, or other vital signs, health conditions, or possible clinical predictors associated with morbidity and mortality. We likewise did not collect data on age or gender, limiting our ability to conduct demographic categorical analyses. Though we were unable to complete this study as the originally designed longitudinal intervention study due to the pandemic, the cross-sectional baseline data we present nevertheless provide important insights into the self-perceived health and work-related satisfaction of office-based care coordinators. Given the paucity of information currently available on work-related health and satisfaction in outpatient nursing care coordinators—a relatively new and rapidly growing section of the healthcare work force (American Nurses Association, 2014; Gross et al., 2019), we believe this study makes an important contribution in this burgeoning field. Importantly, the findings from this study, which used several different modalities to collect information on health habits and perceived health, including self-reported health measures and objectively measured physical activity, help to provide new insights into the actual and perceived health of nurses working in office-based care coordination roles, along with opportunities for improvement, namely increasing daily physical activity levels.

Implications for Practice

Given low levels of physical activity among nurses, including office-based care coordination nurses, efforts to improve the health habits of office-based nurse care coordinators, including work environments adjustments, merit close attention.

Conclusion

Office-based nurse care coordinators have lower levels of moderate-to-vigorous intensity physical activity and report a higher quality of life than their non-nursing counterparts while working in the same environment.

Author Contributions

All authors contributed to the analyses of the data and to the writing of the manuscript. NMO conceived and designed the study, and collected the data.

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Declaration of Conflicting Interests

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