Providence

Providence System Nurse Research and Clinical Scholarship Symposium 2024

Clinical Inquiry: The Catalyst to Nursing Excellence

Nursing Dietary Intake and Continuous Blood Glucose Measurement

Rachel Carlson, BSN, RN
Teresa Rangel, PhD, MSN, RN
Lindsey Miller, PhD
Sushana Sudhi, B.S.

March 1, 2024

Background and Problem Statement

Circadian disruption due to shift work among nurses is linked to cardiometabolic illnesses

Short-term studies (days) of simulated night shift work have identified night-time decreases in insulin sensitivity and glucose tolerance as potential causes of negative cardiometabolic health outcomes.

Short-term studies showed night shift workers presented an increased risk for diabetes

However, the long-term effect of regular night shift work on glucose regulation remains unknown

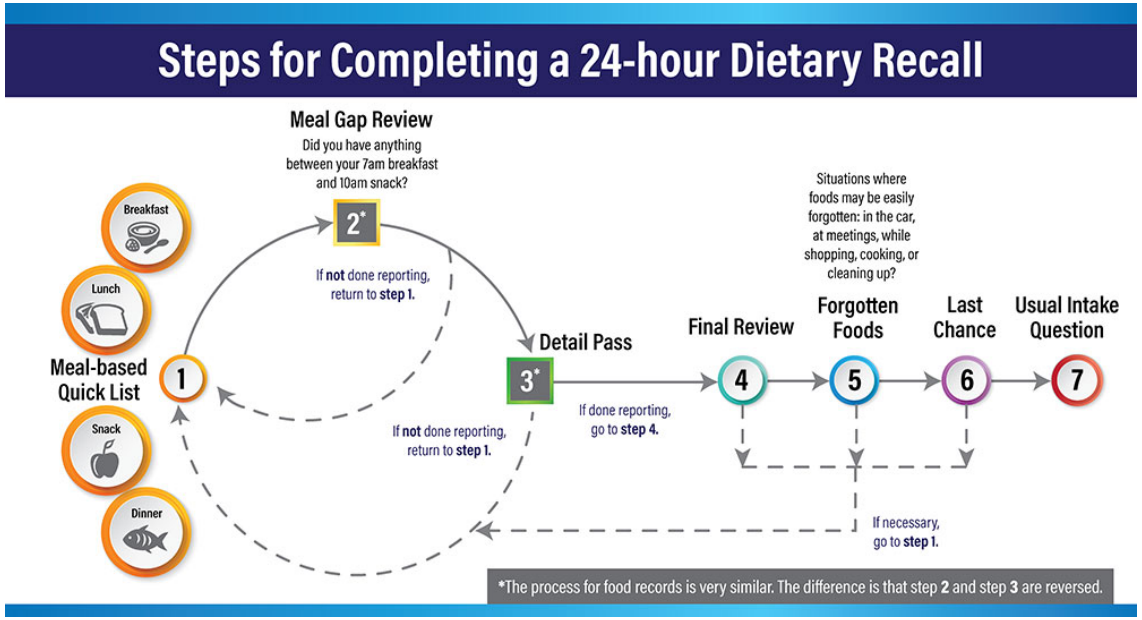
Clinical Question and Project Aims

- Clinical question: Among nurses working full-time 12-hour shifts in the hospital setting, what impact does shift type have on blood glucose levels and self-reported dietary intake?

- Purpose:
  - To determine whether night shift nurses have altered glucose levels and dietary intake compared to day shift nurses.

Methods

- 12-hour night shifts(n=12), or day shifts(n = 9)
- First 3 days on, then 3 days off
- CGM & Automated Self-Administered 24-hour tool(ASA24)
- Data averaged over the total 6-day duration of the study, the 3 days on-shift, and the 3-days off shift.
- Independent t-tests were conducted using SPSS to determine group differences.



Participant To-Do List and Information Sheet

Username: Start Date:

Password: End Date:

DexCom #: Fibion #:

Day 1 – Off Duty – Meet with Rachel ❑ Baseline Survey ❑ W9 Completed ❑ Receive Dexcom + Fibion ❑ Survey Instructions	Day 2- Shift Day ❑ Food Log - ASA 24 ❑ Daily shift status survey ❑ Post-shift Survey
Day 3- Shift Day ❑ Food Log - ASA 24 ❑ Daily shift status survey ❑ Post-shift Survey	Day 4- Shift Day ❑ Food Log - ASA 24 ❑ Daily Sleep and food log survey ❑ Post-shift Survey
Day 5- Off Day ❑ Food Log - ASA 24 ❑ Daily shift status survey	Day 6- Off Day ❑ Food Log - ASA 24 ❑ Daily shift status survey
Day 7- Off Day ❑ Food Log - ASA 24 ❑ Daily shift status survey	Day 8- Off Day, ***Study Complete*** ❑ Contact Rachel, (520) 870-6802, to return DexCom and Fibion ❑ Complete Feasibility Survey

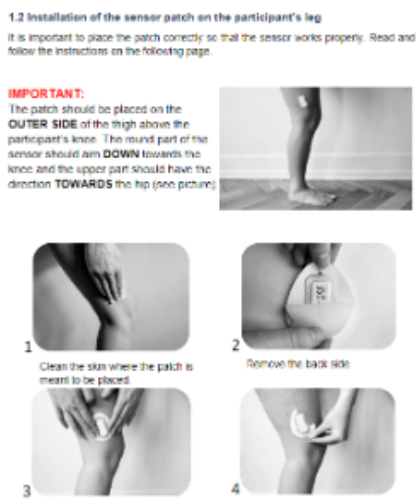
Links for each study task:

- ASA24
  - https://asa24.nci.nih.gov/
  - Login with your username and Password as recorded above
  - Please record all days starting and ending at 0500
  - You may backlog this survey if easier
- Baseline Survey
  - https://redcap.providence.org/redcap/surveys/?s=A7YAEHMYWJ98CPWH

- Daily Shift Status Survey
  - https://redcap.providence.org/redcap/surveys/?s=3DL3PAK4H89T4YMA
  - You may backlog this survey if easier
- Post-shift Survey
  - https://redcap.providence.org/redcap/surveys/?s=7EJ8ACMXCJJE98NE
- Feasibility Questions
  - https://redcap.providence.org/redcap/surveys/?s=3HYJLNM98F349844

Important Information:

★ Use your assigned participant ID for **all** surveys and logs
★ Contact Rachel immediately if your DexCom monitor falls off before the end of your protocol
★ If your Fibion SENS monitor falls off, use extra stickers to stick fibion monitor back to your thigh using the picture below as a guide and contact Rachel about the times fibion was disconnected.



Inclusion and Exclusion Criteria and Considerations for Vulnerable Populations

Inclusion	Exclusion	Considerations for Vulnerable Populations
• All consenting RN staff 18 years and older working on an Intensive Care Unit • Assigned 12-hour day or night shift (not both) • Able to work three, consecutive 12-hour shifts for the study period, followed by 4 consecutive days off work	• Pre-diabetes or diabetes • Taking medications altering blood glucose levels • Pregnant or breastfeeding • Actively trying to change weight status through diet or exercise	• Staff did not receive corrective action if declining to participate • All data completely de-identified

Findings

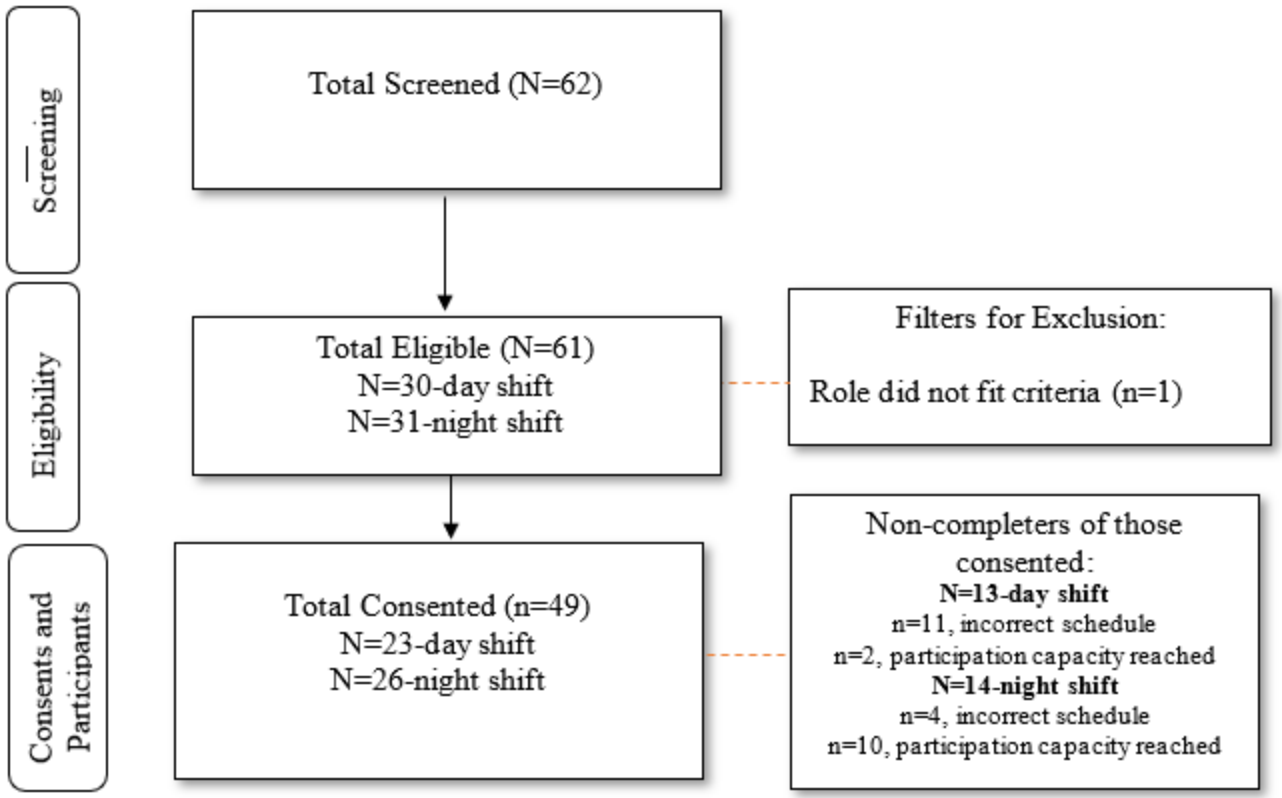
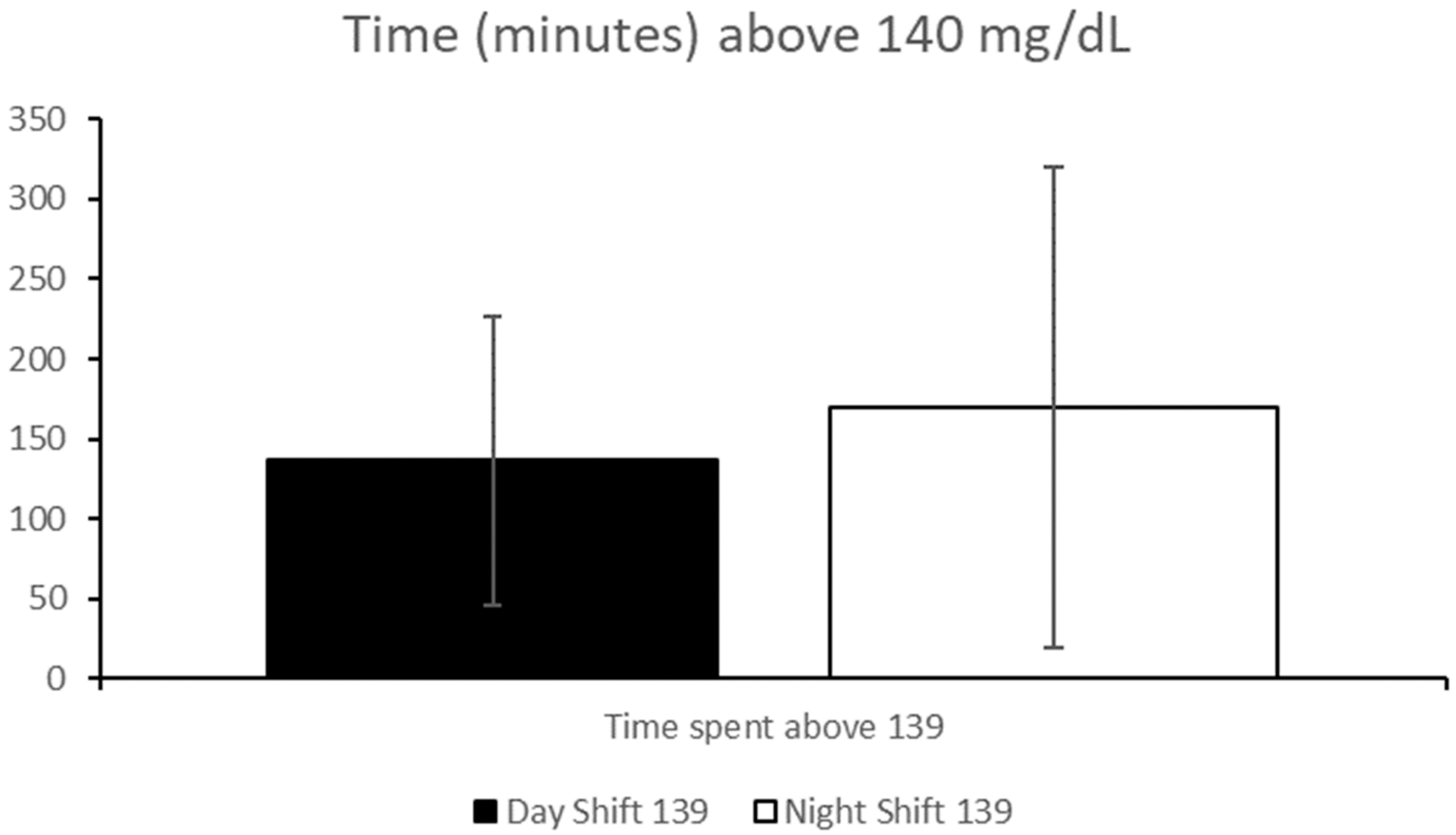


Figure 1. Participation Flow Diagram

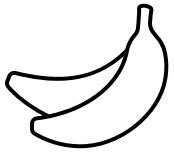
Findings


Time (minutes) above 140 mg/dL
350
300
250
200
150
100
50
0
Time spent above 139
Day Shift 139
Night Shift 139

Findings

- *No significant differences were detected in dietary intakes, although several clinically significant differences were detected.*
  - *Night versus day shift nurses reported lower caloric intake while on-shift, (1752.5 vs. 2129.4kcals, p = 0.073) yet more while off-shift (2266 vs. 2021.7kcals, p = 0.421).*
  - *Sodium intake exceeded recommended daily intake of ≤ 2,300mg per day in both groups yet was highest in night shift (day = 3383.9mg, night = 3796.8mg).*
  - *Average daily fiber intake was lower than recommendations of 25g in both groups (day = 16.2g, night = 17.5g).*

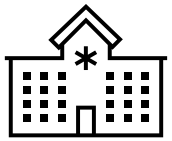


Discussion

1. Night shift nurses in our sample consumed less calories while on-shift, more calories while off-shift, and reported more sodium intake than recommended.
2. Additionally, our study indicates that night shift nurses experience greater glucose variability and spend more time in higher glucose ranges compared to day shift nurses.
3. Future work is needed with larger sample sizes and representative of nursing workforce to verify findings.

Clinical Implications



- Per our findings, dietary interventions may be needed to decrease sodium and increase fiber intake among nurses to reduce risk for cardiometabolic illnesses.
- Additionally, despite lower caloric intake when on-shift, night shift nurses spent more time on average than day shift nurses with glucose ≥ 140mg/dL, increasing risk for type 2 diabetes.
- Blood glucose levels may shift in response to exercise and sleep habits in addition to dietary practices.
- Nurses, particularly when working night shift, should work closely with medical professionals to monitor diet and blood glucose trends to reduce risk for cardiometabolic illness like type 2 diabetes.

Questions? Thank you