



HHS Public Access

Author manuscript

Workplace Health Saf. Author manuscript; available in PMC 2020 August 01.

Published in final edited form as:

Workplace Health Saf. 2020 August ; 68(8): 374–383. doi:10.1177/2165079919890351.

Hospital and Shift Work Influences on Nurses' Dietary Behaviors: A Qualitative Study

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Abstract

Background: Nurses working in hospitals face unique influences on their workplace dietary behaviors, but little is known about what nurses experience as dietary influencers in the hospital setting. Understanding these influences is paramount in developing effective programs that target healthy workplace eating. This study aimed to explore hospital shift nurses' experiences and perceptions of influences on making healthy nutritional choices while at work.

Methods.—This qualitative, descriptive study was guided by the Theoretical Domains Framework and analyzed using thematic analysis. Twenty-one Registered Nurses working 10–12-hour shifts in hospitals in South Carolina, United States, in 2018 were interviewed individually or in focus groups about their workplace dietary behaviors and influences.

Findings.—Framework constructs most relevant to hospital shift nurses included: 1) environmental context and resources; 2) social/professional role and identity; 3) memory, attention, and decision processes; 4) social influences; 5) emotion; and 6) behavioral regulation. Additionally, four major themes emerged: 1) nursing role and responsibilities restrict freedom of movement and minimize individual control over dietary practices; 2) the hospital food environment is oppressively unhealthy; 3) free food is currency and influences consumption; and 4) shift work is a major barrier to healthy eating.

Conclusions/Applications to Practice.—To achieve healthy eating practices in the workplace, hospital shift nurses need supportive systems, policies, and interventions that target and reduce the barriers inherent in hospital-based nursing shift work. To improve hospital shift nurses' workplace dietary behaviors, these findings should inform hospital food policies, workplace wellness programs, administrative practices, and staff education.

Keywords

nurses; diet; shift work; hospital; health behaviors

Background

Nurses comprise the largest healthcare profession (approximately 3 million) in the United States (U.S.), making a healthy nursing workforce imperative to meeting national healthcare needs (U.S. Department of Health and Human Services & Health Resources and Services Administration, 2010). Initiatives such as the Healthy Nurse, Healthy Nation™ Grand

Challenge aim to improve nurses' health, and in turn, the health of their patients (American Nurses Association, 2018). Yet nurses continue to suffer from a multitude of health concerns, in part due to the unique nature of their role and where they work (American Nurses Association, 2017; Occupational Safety and Health Administration, 2013).

Nurses are most likely to work in hospitals, where staffing is required 24 hours a day and 10–12-hour shifts are typically used for coverage (U.S. Department of Health and Human Services & Health Resources and Services Administration, 2010). Shift work, across various industries, is associated with unhealthy eating and obesity (Amani & Gill, 2013; Han, Trinkoff, Storr, & Geiger-Brown, 2011). Similar to the general population, most nurses continue to follow the standard American diet which is low in fruits, vegetables, and whole foods, and high in processed foods (American Nurses Association, 2017); the number one risk factor for death and disability in the U.S. (Murray et al., 2013). As a result, most U.S. nurses are overweight or obese, increasing the risk of many chronic illnesses (American Nurses Association, 2017; Krussig, Willoughby, Parker, & Ross, 2012).

Interventions that encourage proper nutrition for health promotion and disease prevention have the potential to improve nurses' health (Slawson, Fitzgerald, & Morgan, 2013). Even with the advent of many workplace wellness programs in hospitals over the last decades, few have specifically targeted nurses for dietary behavior change (Torquati, Pavey, KolbeAlexander, & Leveritt, 2017). An integrative review by Nicholls et al. (2017) assessed nurses' workplace influences on healthy eating and found few facilitators; rather, they identified many barriers. Most of the reviewed studies were from outside of the U.S. and included nurses from various practice settings, not just hospitals. However, hospitals are unique environments with internal cultures, structures, and politics, and the influences inherent in hospital shift work may be very different from that in other practice settings. Additionally, as cultural and healthcare systems differ between countries, there is limited applicability to U.S. hospital shift nurses' experiences. Within the U.S., variations in cultural norms and dietary practices can impose additional influences on workplace dietary behaviors. To date, no exploratory studies have examined workplace influences on hospital nurses' dietary behaviors in the Southeast region of the U.S., where many preventable chronic illnesses are the most prevalent (Centers for Disease Control and Prevention, 2014). This study aimed to explore: 1) hospital shift nurses' experiences with healthy eating while at work and 2) nurses' perceived dietary influencers in the hospital setting.

Methods

Design

The Theoretical Domains Framework (TDF) guided this qualitative, descriptive study, including the design, interview/focus group guides, data collection, and data analysis (Atkins et al., 2017; Power, Kiezebrink, Allan, & Campbell, 2017). The TDF includes 14 theoretical domains derived from a synthesis of 128 theoretical constructs from 33 relevant theories, see Table 1 for domains and definitions (Atkins et al., 2017). The TDF represents the multifaceted nature of human behavior, and the inclusivity of the framework offers a versatile tool for categorizing the most salient influences on a particular behavior. The Consolidated criteria for reporting qualitative research (COREQ checklist), which is a

comprehensive guideline in qualitative research, was followed in reporting this study methods and results (Tong, Sainsbury, & Craig, 2007).

Prior to the study activities, human subjects approval was obtained through the [hospital system name redacted] Internal Review Board. Informed, written consent was obtained from participants prior to data collection. Nurses from seven hospitals in the upstate region of South Carolina were recruited through paper flyers, electronic mailings, and word of mouth. Personal acquaintances of the Primary Investigator, meeting the inclusion criteria, were also asked to participate. Participants were informed of the primary investigator's nursing experience, and interest in the research topic. The sample included Registered Nurses (RNs) currently employed full-time, part-time, or as-needed (PRN) by a hospital, working 10–12-hour shifts and able to meet in-person. Based on the scheduling convenience, either an interview or focus group could be chosen by the participant.

Data collection

In-person interviews and focus groups were conducted by using a semi-structured interview or focus group guide with open-ended questions based on the TDF domains. Interviews ranged from 26 minutes to 1 hour; focus groups lasted 40–61 minutes. All sessions were held in a quiet room or public space, free from distractions, and were audiotaped and transcribed verbatim. Only participants and the interviewer were present during interviews/focus groups.. No incentives were offered for participation and encounters were conducted on the participants' personal time.

During and after the interviews/group discussions, the two primary researchers conducted reflective journaling and field notes were part of an audit trail to enhance confirmability in the study (Williams, 2015). Self-reported demographic information was collected without any identifiers attached.

Data analysis

The data were analyzed according to the TDF, using the thematic analysis approach and began immediately upon data collection (Braun & Clarke, 2006). Transcripts were generated, then compared to the original recordings to assure that the text represented the participant statements as accurately as possible. The iterative processes of transcribing, coding, and returning to further data collection provided a more complex understanding of the themes as they emerged from the data. Both researchers coded the data while considering the TDF so that the primary domains of influence were identified. While data saturation was achieved at eight participants, data collection continued until a number of RNs representing various work areas and different hospitals were interviewed. To ensure confidentiality, participant quotes were identified by the participant's nursing specialty.

Results

See Table 2 for sample demographics and nursing work experience. Sixteen one-on-one interviews and two focus groups (n=5 participants) were conducted for a total of 21 participants.

Reported dietary influences were categorized according to the TDF domains. The findings revealed dietary influences from all 14 TDF domains, however, the most relevant to hospital shift nurses included: 1) environmental context and resources; 2) social/professional role and identity; 3) memory, attention, and decision processes; 4) social influences; 5) emotion; and 6) behavioral regulation. Findings from each TDF domain are summarized with supporting quotes in Table 1.

Major Dietary Influences

The analysis revealed four predominant themes of influence that had the greatest impact on hospital shift nurses' eating behaviors while at work: *Nursing role and responsibilities restrict freedom of movement and minimize individual control over dietary practices; The hospital food environment is oppressively unhealthy; Free food is currency and influences consumption; and Shift work is a major barrier to healthy eating.*

Nursing role and responsibilities restrict freedom of movement and minimize individual control over dietary practices.—Nurses with patient assignments retained responsibility for their patients' health and safety during the entire shift, typically including during breaks. Therefore, nurses could not leave their assigned patients without getting another nurse to cover their responsibilities during that time. Finding coverage could be challenging depending on staffing level and patient acuity. In most acute care areas, nurses that covered for peers on break had their own assigned patient load and were covering an additional set of patients. Depending on the assigned patients' acuity and pace of workflow, nurses may not have been able to take on the additional responsibility. Furthermore, there was a perceived expectation from other disciplines, peers, and patients that the nurse should be available at all times. This expectation influenced how far away from the unit the nurse could go, the break duration, interruptions, and rest during the break:

It is very sick people, and just don't have the time to get away. And again, they call. If you do sit down to eat lunch, and you have your phone, and you've got to have your phone with you, they call you right back. Very rarely, I would say, in the last three weeks I have had two lunches where I actually sat down for 30 minutes, and this just happened to be slower days. (Emergency Department)

Nurses often felt a sense of obligation to their team during busy workflows and preferred to stay and continue to work rather than to take care of personal needs and take a break. One nurse described the hesitancy and obligation she felt about leaving the unit: "I feel like when you are that far away, which isn't even that far, but when you remove yourself, what if there's something that comes, like a trauma, or something where your team needs you?" (Emergency Department).

The constant pressure of maintaining responsibility at every moment of a long shift exacerbated busy workflows and caused extra stress which heavily influenced the nurses' dietary behaviors. Nurses often used "comfort" foods to cope with job-related stress and exhaustion: "If I've had a bad day at work, or it's been a long day at work, I will be like 'give me the worst thing that I can have, and I want to go to bed!'" (Subacute/Rehab).

and

You feel like if you are working these long hours, you're away from your family already, you feel like 'I deserve this bag of potato chips, and I'm going to walk it off anyways because I'm going to go to room 10, 15 times in the next 20 minutes!' so you kind of start validating those choices. (Subacute/Rehab)

Regulatory requirements prohibit eating/drinking in patient care areas due to infection control concerns (Occupational Safety and Health Administration, 2018). Yet, nursing responsibilities keep nurses at or near the bedside, creating a burden to go somewhere to get food/drink, no matter how close that is. As a result, nurses reported not eating for long periods and dehydration. While participants were not asked specifically about drinking practices, most (n=18) reported dehydration at work. Even if the nurse was able to hydrate adequately, the time-burden of having to go to the bathroom more frequently post-hydrating was perceived as an unwelcome consequence:

If I happen to have a lull in between patients, I will grab a quick drink of water, but then if you do drink too much, you have to go to the bathroom and there's definitely no time for that! (Post-Anesthesia Care Unit)

When nurses became very hungry but didn't have the time or ability to step away, foods were stored in pockets, bags, or drawers at the nurses' station. These were typically dry, quick, and easy-to-eat foods while on the go:

Whatever I can put in my mouth when I am walking or running or moving, it has to be convenient, so most things that are convenient aren't really healthy. I can't really walk down the hall eating an apple or a banana, but I can stick a bag of chips in my pocket, or a pack of cookies in my pocket that I can snack on when I'm running around. (Subacute/Rehab)

Hurried eating was another alteration from normal eating patterns. Due to the nurses' responsibilities and busy and uncertain workflows, sitting down and eating at a normal pace was often not possible, affecting the types and amount of foods consumed:

If you're a nurse, you don't stop until your patients are done and they don't need you. And that's when you take care of yourself. You're holding your bladder and you're eating junk food instead of the salad you made for yourself, because it's quicker and you can get back to your patients. (Emergency Department)

Even when nurses were prepared and motivated to eat healthfully at work, the lack of control over workflow and timing of patient-care needs dictated when and how they could eat. This was especially true for areas with a high degree of uncertainty in the workflow, such as the Emergency Department: "You can't say like every day at 6:30, maybe before shift change, 'I'm going to sit down and take 31 minutes to eat', because that's just not always an option" (Emergency Department). Or in small units with limited staffing: "We get a lunch break, but we don't really get a break, because if there's only two of us, it's not like someone can just go away. If someone needs something, we are still there" (Pediatrics).

Or, on night shift:

It's a small unit; we can't clock out and anywhere... you should be able to take your 30 minutes and do what you want with it, and you can't here. So, that makes it

a little bit difficult because it would be nice to go off and do something; go for a walk, but you can't. I can't leave. (Intensive Care Unit)

Hospital food environment is oppressively unhealthy.—The food landscape inside the hospital was a major influencer on nurses' dietary behaviors due to the disproportionate availability of unhealthy food options as opposed to healthy ones. There were three main channels of food access in the hospital: 1) food for purchase, which included cafeteria and vending 2) brought-in food, (e.g., packed lunches), and 3) free food, which was any kind of food/candy/beverage available at no financial cost. Free food was frequently available in the hospital environment and was usually found in close proximity to nurses (e.g., the nurses' station), influencing consumption. Free food emerged as a separate predominant theme and is discussed later in detail.

Healthy choices available for purchase were generally limited to a baked option and/or salad bar only in the cafeteria. The cafeteria, however, was not open 24/7 and in smaller facilities, might be closed nights and/or weekends:

The cafeteria here does have these healthy choice options that they put out every week, but its only targeted for one small specific group of people, and you think about the bigger population that's here working in the hospital, that's the minority who work 7 to 3. (Emergency Department)

Further, tempting "comfort" foods were made available in the cafeteria and distracted nurses from the healthy options: "It's the same old salad every day, and I don't want a salad, and then it's like, 'oh well, they have chicken alfredo or ravioli!' and I'm going to get pasta!" (Medical/Surgical). Nurses also reported that cost influenced choice. Healthy options tended to be more expensive, with salads costing upwards of \$12 as compared to a \$2 hamburger: "The healthy options that they have here are expensive. You are not really going to, in a real world, pay \$5 and some change for a cup of strawberries" (Subacute/Rehab).

In addition to the limited hours and options, some nurses had the challenge of accessing a cafeteria located remotely from the nursing units. The time needed to get to the cafeteria - and potentially stand in line - were barriers to nurses who were restricted to 30-minute breaks:

Everyone says 'Oh my god! You eat so fast!' I said, 'because I am a nurse!' I have about 16 minutes to eat by the time you walk all the way there and then you have to walk all the way back. (Post-Anesthesia Care Unit)

Outside of the cafeteria, foods for purchase were obtained from vending machines, gift shops, fast food restaurants (located both inside and outside the hospital), and restaurant delivery. Vending machines were the main food source available on site 24/7, typically on or near the nursing units, and stocked with processed, calorie-dense, low-nutrient snacks and candies. When nurses were pressed for time, tired, and hungry, vending machine foods became the easiest option:

It's really easy to just walk over to a vending machine and grab something. When you haven't taken a bathroom break in six hours, it's hard to take the time to go

back and pour dressing over your salad and then actually eat it as opposed to just grabbing a Snicker's bar. (Emergency Department)

The hospital food landscape and stressful environment posed barriers for healthy eating. The stress and exhaustion that nurses felt while at work inhibited their ability to make the healthy food choice given the abundance of unhealthy foods:

It's kind of odd how many unhealthy options there are, even in the hospital cafeteria, just like those giant pastries and stuff like that ... even if you're a family member there, or working there, or, no matter why you are in the hospital, you are probably under some kind of stress, and you don't always make the best decisions when you are like that. (Intensive Care Unit)

Free food is currency and influences consumption.—Free food was a common element in the hospital environment and became a kind of currency exchanged for many reasons. In cases where offering money would be inappropriate, nurses were given free food.

Leadership offered free food to nurses as a reward, incentive, consolation, and for celebrations. Free food was also used as a bribe for attendance at meetings, to lure staff into management's office, and to boost morale on the unit. Patients and families offered free food to nurses to show their appreciation. Peers brought and shared food for comradery. Typically, free foods included indulgent, low nutrient, "comfort" foods such as candy, cookies, pizza, chips, cake, and donuts. The availability of free junk foods in the environment influenced nurses' consumption:

I try not to eat those things. I will say, I have had a cookie or two, so there are things that I've eaten that I wouldn't normally choose. (Emergency Department)

Martha, an Emergency Department nurse added:

Usually when people are bringing in extra snacks for everybody, you are snacking, you are eating some of that. Even if you don't want it, you are eating it, because it's there. You are walking by, you see it, it's there, I'm going to have some of that.

The very fact that food was provided at no cost, influenced consumption:

It doesn't matter [what it is], if it's free food, I'm going to take it! (Medical/Surgical)
Another nurse explained the power of free food:

Honestly, we are the easiest people to bribe. Give us food ... we will eat it! We don't really turn down free food. That's the hardest part if you are trying to be good and trying to not have that temptation, you go into work and you are just like, 'but there's donuts and all this stuff on the table, and I just want one!' And then one turns into four, and then, you are like 'well, I guess I was already bad today, so I guess the week is kind of already shot, so I'll start again Monday' and then it's just a vicious cycle. (Pediatrics)

All participants reported access to free food on a regular basis. Due to social aspects, ease of access, and the indulgent types of foods provided, nurses were inclined to consume free foods adding unplanned calories to workdays.

Shift work is a major barrier to healthy eating.—The eating patterns of nurses while at work were significantly different from home, largely because of the lengthy shift. Working 10–12-hour shifts caused nurses to eat earlier, later, or in the middle of the night. Often, they did not eat at all. Most nurses ate when they returned home, and due to time constraints imposed by long shifts, would then go to bed with a full stomach. Subsequently, nurses suffered from sleep-quality compromise, gastric reflux, and weight gain.

Over-eating was reported as a common occurrence due to exhaustion and extreme hunger after lengthy shifts and long periods without food:

If you wait too long to eat, you will overeat, you'll stress-eat. There tends to be way too many sweets, like candies or stuff that families will bring in to you, and you will gorge yourself on that if you are waiting too long to eat, so you shove like 5 fun-size Snicker's in your mouth. (Intensive Care Unit)

If nurses anticipated that breaks would be unlikely, then eating when and what was available, even if not hungry, was common. One nurse described this as a survival instinct:

I get home, I'm like 'wow! I ate three doughnuts while I was at work today!' But it's almost like, a panic, is what I feel when I think back on it. I wasn't thinking about why I was eating it, I was just thinking that I should eat it, or needed to, in the frame of mind that I was in... it's that panic feeling and then not knowing when you're going to be able to eat again. (Medical/Surgical)

Nurses perceived the need for quick energy to perform their best during long shifts. Fast, high-caloric foods and caffeine were commonly used during busy workflows; and during slow workflows to ward off boredom or sleepiness.

Third shifters are known to gain more weight than day shifters because 3 or 4 in the morning, its carb frenzy! I mean, your body is like 'carb! carb! carb!'... you think you are doing good and then, you just need that pick-me-up, and then its carbs. (Medical/Surgical)

Shift work encroached on personal time, especially when working several long shifts in a row, and it inhibited the nurses' ability to shop, cook, and pack food for work. Due to a total lack of options and a higher degree of difficulty in purchasing healthy foods while at work, 100% of the nurses cited bringing meals and snacks as being the best strategy to healthy dietary practices. However, even when able to bring healthy foods, there were barriers in the workplace to eating it. The abundance of tempting foods, social aspects of free food, boredom with the same packed lunch, and the inability to take a break, were reasons why bringing healthy foods from home did not guarantee consumption. Still, nurses recommended bringing a variety of healthy, quick, and easy foods to increase the likelihood that they would be consumed.

The challenge in a hospital environment, where the nurse is confined for 12 hours, was that eating healthfully was often the "hard" choice. When asked how easy or difficult it was to eat healthfully during a shift, all responded with the sentiment:

If I don't pack something, I would say that it's very difficult. That's again due to availability, cafeteria's only open very limited time, can't go far away, usually your choices in the vending machine are junk. (Emergency Department)

Discussion

Hospital-based nurses were able to identify workplace influences on their eating habits. Hospitals are unique environments that pose distinct challenges to maintaining and improving employee health. Shift work and busy workflows, often present in hospitals, were major contributors to unhealthy dietary practices by nurses. Nursing responsibilities, which are unique and constant, influenced dietary behaviors. Beyond feeling obligated, nurses are in fact legally required to remain with patients and address needs (South Carolina Law, n.d.). The role of the bedside nurse, in this way, is different from any other discipline on the treatment team. For example, while medical doctors have a legal obligation to the patients' healthcare, the nurse is responsible to address all immediate needs, including physical, emotional, and spiritual, and are expected to remain in close proximity at all times, ensuring quick response. The nursing responsibilities that require nurses to stay in close proximity to the patients affect what, when, and how the nurse eats.

The hospital food environment posed particularly challenging barriers to healthy eating. The abundance of unhealthy foods that were accessible 24/7, and oftentimes for free, combined with the lack of healthy food options, required nurses to bring food from home if they wanted to eat healthfully. The challenge with bringing healthy meals and snacks to work is the time required for their planning and preparation. The nursing workforce is approximately 93% female, and even though family dynamics have changed with time, women still retain the majority of household activities (U.S. Department of Health and Human Services & Health Resources and Services Administration, 2010; United States Department of Labor & Bureau of Labor Statistics, 2016). Shift work and family responsibilities restrict personal time to the degree that having to plan and prepare healthy meals becomes exceedingly burdensome. For nurses exhausted from hospital shift work, the healthy choice quickly becomes the difficult choice.

Given that nurses are the most numerous of healthcare professionals in hospitals, workplace dietary interventions should first target the food-choice barriers specific to nurses. Location, price, and availability of healthy foods are all important barriers for nurses that if addressed, could improve the hospital food environment for all. Shift scheduling may be preferred by administrators and staff, but the many side effects of shift work should be considered when developing policies on breaks and food environments. Adequate time for obtaining healthy foods and the uninterrupted opportunity to eat properly should be of primary focus. Further, nurses are typically involved in patient mealtimes and often provide dietary education. Improving nurses' knowledge and personal-dietary practices could improve efficacy of patient counselling (Esposito & Fitzpatrick, 2011).

Strengths and Limitations

In this study, the participant demographics reflected the proportions found in the national hospital-based nursing population, except for race. The sample was predominantly white,

therefore may not reflect some cultural variations. A Body Mass Index average of 28.4 in this sample, reflected previous findings that nurses were overweight at similar rates to that of the general American population (Han et al., 2011; Krussig et al., 2012). The mix of day/night shift nurses and different practice settings in the sample strengthened the findings by providing a wider understanding of the varying experiences of nurses in hospitals. All participants worked in South Carolina, limiting the transferability to culturally and socioeconomically different locations.

Implications for Occupational Health Practice

Poor dietary practices put the nursing workforce at risk for illness, and the unique barriers that exist for hospital shift nurses were highlighted here. While each nurse has individual preferences that affect eating choices, there are common experiences in the workplace that contribute to and perpetuate one another, continuing the never-ending cycle of harmful dietary practices. Any break in the chain has the potential to improve nurses' dietary behaviors. Key interventions that offer potential to improve dietary practices could include: 1) Change the workplace food environment using toolkits and guidelines for healthier hospitals available from the Centers for Disease Control and Prevention (Centers for Disease Control and Prevention, 2017); 2) Hospital leadership support in making nurses' health a priority through resource allocation to ensure that nurses have duty coverage in order to take breaks, and through offering non-food incentives or changing the types of free foods offered; 3) Offer workplace wellness programs that are flexible and accessible to shift workers- to include nutrition education and counseling offered on or near nursing units; and 4) Workplace wellness programs focused on success in the workplace as opposed to during personal time (e.g., recipes for quick, healthy meals/snacks, and sell healthy, packed to-go meals 24/7).

Free food was cited as a driving influence in making unhealthy food choices, yet little research has explored this concept. Future research should explore free food in the workplace, including its prevalence, quality, and effects. The prevalence of unhealthy hospital food environments also needs to be evaluated to appreciate the gravity of the problem. Interventions that specifically target nurses' dietary practices need to be implemented and tested. Research, in particular, on environmental interventions that address the many barriers experienced by hospital shift nurses, is needed. This study identified several predominant influences on dietary behaviors that nurses experience in the hospital setting, which should inform those interested in improving the dietary health of nurses.

Applying Research to Occupational Health Practice Insert/Box

This exploratory study provides an understanding of workplace influences on dietary behaviors for hospital-based Registered Nurses in the Southeast United States. Nurses face many barriers to healthy dietary practices in hospitals, particularly related to the food environment, nursing role, and shift work. The hospital food environment is predominantly unhealthy, including frequently offered free junk foods, which inhibits nurses from making healthy food choices. The nursing role is unique to other disciplines and restricts the distance and time nurses can spend away from patients. Shift work imposes various additional barriers related to physical, mental, and emotional wellbeing which all impact

dietary behaviors. Workplace interventions that target these barriers are needed to improve nurses' dietary behaviors and promote health in the nursing workforce.

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Table 1

Theoretical Domains Framework with Definitions[‡], Associated Findings, and supporting Participant Quotes

TDF Domain with definition	Findings	Participant Quotes
Knowledge An awareness of the existence of something	Knowledge and awareness of healthy nutrition were enablers, but not necessarily influential.	"Education is not the issue. I know what I need to do, doing it is another story." (Medical/Surgical)
Skills An ability or proficiency acquired through practice	Healthy eating required skills in meal planning and preparation.	"when I do bring my lunch, I prefer fresh things, like fresh salads and stuff like that, fresh fruits, and so if I don't have the time to prepare that type of thing to bring, then most likely I'm not going to bring it" (Subacute/Rehab)
Social/professional role and identity A coherent set of behaviors and displayed personal qualities of an individual in a social or work setting	The nursing role and responsibilities limited freedom of movement, time, and separation from burden of responsibilities.	"we don't get to disconnect, so even if you have that 30 minute, if something goes on with your patient, you are expected, so you are constantly thinking about that" (Subacute/Rehab)
	Nurses felt an obligation to patient and peers first; cared for themselves last.	"you keep going until the patients are taken care of" (Emergency Department)
	Leadership played an important role in setting expectations for breaks and supporting efforts through allocating resources.	"I think the biggest factor is just coming down from management, making sure that we're doing that 30 30-minute window... I think it has been highly impressed on management to make sure that we get the breaks." (Labor & Delivery)
Beliefs and Capabilities Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Healthy eating at work required a lot of effort and determination.	"as far as choices, you can make the conscious effort but there is going to be temptation, there is going to be food around, there is going to be, if you didn't bring anything then you are stuck with what's available" (Pediatrics) "you could make a concerted effort to fix it, so, if you try hard enough, I guess you could [eat healthy]" (Pediatrics)
	Personal time constraints from family responsibilities and shift work hindered nurses' abilities to put forth the effort needed.	"you're working here three or four days a week, 12 hour days, you have a family, you have home, that only leaves you [limited personal time], and if you work nights you are already missing another day because you are sleeping all day" (Palliative Care)
	The lack of control over timing of meals/eating at work was a major barrier.	"when you are at work it's not, you can't eat just whenever you want" (Post Anesthesia Care Unit) "what the team needs, how workflows going, when we have the extra coverage, some days you are forced to break early, some days later, some days not at all, just however workflow is" (Medical/Surgical)
Optimism The confidence that things will happen for the best or that desired goals will be attained	Workplace wellness programs were positively perceived.	"I think it's great, I like how we have made a thing here not to fry anything, to make baked chicken and I think that's awesome!" (Medical/Surgical)
	Incongruent messaging between programs, environment, and policies were negatively perceived and reported to be a barrier.	"I was a little upset, and I thought it was kind of ironic because right next to it is a vending machine that has a honey bun, so you are going to take away my sugared beverage choice and then give me the option of a honey bun right next door? I just feel like it should be kind of all or nothing." (Emergency Department)
Beliefs about Consequences Acceptance of the truth, reality, or validity about outcomes of a behavior in a given situation	Some nurses were motivated to maintain health after working with chronically ill patients, while others didn't internalize the risks.	"I want to be healthy. Especially in an environment where you see a lot of sick people, and doing what I can to take care of myself now." (Medical/Surgical) "I don't think any part of that goes into your mind of like 'oh, well I had a patient that is diabetic, maybe I should control my sugar intake'" (Pediatrics)
Reinforcement Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	Free food was used as a type of currency to bribe, console, congratulate, thank, reward, incentivize, and boost morale.	"our Leadership, [says] 'hey, there's donuts at the staff meeting, come check it out', or someone gets an award, or a baby shower, so it's like a reward, it's like here, 'do this for me and I'll give you a donut'" (Medical/Surgical)

TDF Domain with definition	Findings	Participant Quotes
Intentions A conscious decision to perform a behavior or a resolve to act in a certain way	Strong personal motivation/intention was the first most important factor to achieve healthy eating at work but was often overpowered by barriers inherent in hospital nursing shift work.	"I don't think that people change eating habits unless they want to, it's not what is dictated to them, it's what they want to do" (Palliative Care) "That's the hardest part about if you are trying to be good and trying to not have that temptation, you go into work and there's donuts and all this stuff on the table." (Pediatrics) "I mean it's just not reality, because I know I try to do that [eat healthy] and I'll bring carrots and ranch dip or like a protein bar or something and [try to eat every couple hours] and spread out my calories but it just, it's just not feasible all the time because it just depends on how busy you are" (Medical/Surgical)
Goals Mental representations of outcomes or end states that an individual wants to achieve	Nurses had personal health goals for diet, exercise, hydration, sleep, and stress management.	"trying to get enough sleep, and I drink plenty of water" (Medical/Surgical) "on a daily basis I do focus on my diet, and trying to eat healthy" (Intensive Care) "meditating every day, yoga, I stay active" (Subacute/Rehab) "I really try to get exercise every week" (Medical/Surgical)
	Nurses did not focus on personal health while at work.	"when you are a nurse, you just don't think about yourself, you just go, and when I say I wouldn't pee, or go to the bathroom or take breaks, it's because I just never really had time to because you just don't stop" (Medical/Surgical)
	Hospital nursing shift work was a barrier to achieving health goals.	"When I'm at work, or when I am on consecutive days, [work is] the only thing I focus on, I do nothing else. I go to work, I sleep, and then I go back to work. I don't even attempt to try to exercise or do anything on the days I work." (Intensive Care)
Memory attention and decision processes The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives	Hospital nursing shift work was physically and mentally exhausting which decreased nurses' abilities to make healthy choices.	"I leave for work around 6:30, and I usually get home around 8, and then I go back so it's just there's no time, and then I'm physically exhausted and mentally... I feel like healthy eating is a choice and sometimes you don't feel like, you are just so tired, I don't have time to cook something healthy or go out of my way to make sure it is healthy" (Intensive Care)
Environmental context and resources Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior	The hospital food environment posed significant barriers to making the healthy choice.	"It's definitely harder to stay on track [at work], especially if you know in the break room, you bring a nice healthy lunch and then there's cake and donuts, and chips and salsa, and pizza, it's just if I see it, that's all I can think about, that's what I want and I end up eating it." (Medical/Surgical)
	Foods that were available 24/7 and/or in close proximity to the nursing units were junk foods/candies.	"I come in here at 2pm some days [the cafeteria] is closed... and there's nothing offered other than a vending machine" (Emergency Department) "a little café, they close at four o'clock in the afternoon, so all we have [on night shift] is this instant coffee stuff that comes out of the dispenser [and] vending, that's it. Candy, cookies, chips, diet soda" (Intensive Care)
	Free food was readily available and rarely healthy.	"in the hospital especially, people bring stuff to eat, like a lot of unhealthy things always available, like frequently on the unit" (Intensive Care)
	Workflow and staffing imposed additional barriers.	"the time, timing of patient care, the turnover of patients, the availability of additional staff, management support, we don't have a lot of support for putting something in place to eat, to have lunch breaks, or restroom breaks" (Emergency Department) "By the time it's time to eat, I just need to grab something, so I know that influences the way I eat a lot, because I need something quick. I don't need something that I'm going to just really sit down and have to either prepare or cut up or, and that comes with eating something fresh" (Subacute/Rehab)
Social influences Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviors	Social aspects of sharing food with peers influenced dietary behaviors.	"We have all the menus so we'll kind of sit there and talk about 'well, what do you want to eat tonight?' And if we get the momentum going to all eat healthy, then we'll all get salad, but of course it's a restaurant salad with six pounds of cheese and three or four cups of dressing on it. Basically, not much better than a burger... But if I say I don't want to order something they'll say, 'are you sure? you don't want to be left out' and I'm like 'yeah, you're right, I should get something'" (Emergency Department)
	Eating junk foods was a socially accepted norm.	"all the other things are socially acceptable, like to eat bad, to drink is fine, but smoking still is a kind of, you just don't smoke" (Pediatrics)

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TDF Domain with definition	Findings	Participant Quotes
	Unit norms for breaks influenced break and dietary behaviors.	On our floor, we respect each other's breaks, like when you are on break you just don't [interrupt], you just go ask somebody else... I like my break and I need my time off so I'm not going to mess with somebody else during their time off." (Medical/Surgical) "we are supposed to get 30 minutes un-interrupted, but you will still see people come into the break room and be like 'hey, I know you are on lunch, but can you, what about, can this person have pain medicine yet' and I just want to lock that door and say this is a private area. We are on break, do not come in here! So, whether it's the Doctor, Physician's Assistant, the Nurse Practitioner, or a Therapist or one of your other nursing staff, there is freedom to come in and interrupt your lunch time." (Intensive Care)
Emotion A complex reaction pattern, involving experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event	Hospital nursing shift work fostered feelings of stress and survival which influenced dietary behaviors including the types of foods eaten.	"at work it's a matter of survival, its, can you eat? when will you eat? and a lot of times we don't get a lunch break, so I will go hours or maybe a whole shift without eating" (Emergency Department) "If I'm stressed, I don't want a carrot, No! If I'm mentally stressed, I want some macaroni and cheese and some fried chicken!" (Subacute/Rehab)
Behavioral Regulation Anything aimed at managing or changing objectively observed or measured actions	Best strategy for healthy eating: bring plenty and a variety of healthy, quick and easy foods/snacks and a water bottle.	"If I don't spend time planning, I make bad choices, because I have to make sure I have a couple options. If I get there and decide 'well I really don't want carrots', if I don't have strawberries instead, it's really hard to talk myself out of going to get potato chips." (Emergency Department) "I will almost always bring a meal to work because I don't like going to the cafeteria, but the snacks, if I'm good then I will pack snacks that are good, and I will eat those." (Labor and Delivery)

[†] Atkins, L., Francis, J., Islam, R., O'Connor, D., Patey, A., Ivers, N., et al. (2017). A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation Science*, 12(1), 77. doi:10.1186/s13012-017-0605-9

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Table 2:

Study Sample Characteristics

Characteristics	Data mean n (%)
Age	
20–29	6 (28.5)
30–39	6 (28.5)
40–49	4 (19)
50–59	3 (14)
60–69	2 (10)
Ethnicity	
White	19 (90)
Black	1 (5)
Native American	1 (5)
BMI	
18.5–24.9	7 (33)
25–29.9 (overweight)	8 (38)
>30 (obese)	6 (29)
Years Nursing Experience	
1–4	5 (24)
5–9	10 (48)
10–14	3 (14)
20–24	2 (9)
>30	1(5)
Current Work Area	
Emergency Department	4 (19)
Pediatrics	3 (14)
Medical/Surgical	5 (24)
Intensive Care	3 (22)
Post-Anesthesia Care Unit	2 (9.5)
Subacute/Rehab	2 (9.5)
Palliative Care	1 (5)
Labor and Delivery	1 (5)
Shift	
Day	1 (5)
Day/weekend	9 (43)
Night	2 (9)
Night/weekend	5 (24)
Evening	1 (5)
Various	3 (14)
Hospital Size	

Characteristics	Data mean n (%)
<100 beds	9 (43)
200–300	1 (5)
>500 beds	11 (52)

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