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Teaching Heart Failure Patients a Low-Sodium Diet

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MSN, Walden University, 2011

BSN, Oklahoma Wesleyan University, 2005

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Congestive heart failure (CHF) is a progressive medical condition affecting more than 7 million people in the United States (US) with 700,000 new cases reported annually. More than half of those treated for CHF are readmitted at least once a year. The problem addressed by this quality improvement initiative was lack of adherence to low sodium diet (LSD) among CHF patients, knowledge and skill deficit, and excessive 30-day CHF readmissions. The health belief model and the self-care deficit theory guide nurses in acquiring the skills needed to teach LSD. Twelve months of data were selected from 93 CHF readmissions from a target population of 499 CHF admissions. Measures of central tendency were used to extract meaningful summaries between variables for patterns related to 30-day readmissions and to plan educational interventions to improve patient outcomes. The educational intervention focused on educating nurses to teach adult patients with CHF to adopt a LSD. Discharge teaching materials developed were standardized, customizable, evidence-based, and included opportunities for evaluation of patient understanding and reteaching as necessary. Analysis of variance was conducted to evaluate the difference between days to readmission and compliance with patient the education process, and no significant difference ($p < .05$) was found ($F(3,89) = .314$, $p = .815$). The implications of this project for social change include preparing nurses to teach patients to adopt a LSD, empowering CHF patients to improve health outcomes, and improving the financial outcomes related to CHF.

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Section 1: Nature of the Project

Introduction

Congestive heart failure (CHF) is a progressive medical condition which affects the circulatory and respiratory systems (Inamdar & Inamdar, 2016). According to Mosalpuria et al. (2014), there were more than 5.7 million people with CHF in the United States (US) alone with 700,000 new cases diagnosed each year. CHF results in repeated hospital readmissions, such that more than half of those diagnosed are readmitted at least once a year (Mosalpuria et al., 2014). CHF exacerbation and readmissions are often related to difficulties with comprehension of the disease process and management plan, multiple comorbidities, and gaps in health care coordination; these problems are often associated with poor health outcomes and decreased patient satisfaction (Stevenson, Pori, Payne, Black, & Taylor, 2015). Early diagnosis and appropriate medical management can improve the quality of life and may extend the life expectancy of patients who suffer from CHF (Stevenson et al., 2015).

This Doctorate of Nursing (DNP) quality improvement (QI) project focused on improving the low sodium diet (LSD) education process and materials for adult patients with CHF. Changes in nutrition are among the modifiable risk factors that people living with chronic diseases are commonly encouraged to adopt. A LSD is a dietary modification customarily recommended for people with CHF. Maintaining appropriate levels of sodium may minimize fluid retention, prevent exacerbation of symptoms, and reduce the number of hospital readmissions for acutely decompensated heart failure (Cogswell, Mugavero, Bowman, & Frieden, 2016). However, only half of the patients

attempt to adhere to LSD recommendations; this may be due to unclear education (Cogswell et al., 2016).

Self-care is a process of maintaining health through monitoring of symptoms and adhering to a treatment plan (Amaral, Rossi, Lopes, & Lopes, 2017). When signs and symptoms occur, there is often a need for decision-making about self-care. The ability for a patient to maintain their health in the face of dynamic health conditions, such as CHF, is dependent upon a person's level of confidence to make self-care decisions and competence to implement the intervention (Amaral et al., 2017).

Self-care denotes a person's accountability for health behaviors and activities necessary to monitor and manage their health conditions. Dietary sodium reduction is a significant self-care undertaking for people with CHF to maintain their health and slow the worsening of their disease (O'Connor et al., 2016; Wong et al., 2016). O'Connor et al. (2016) said that approximately 25% of people with CHF who do not adhere to a LSD have a 50% chance of being readmitted to the hospital within 30 days. The benefits of self-care include maintaining psychological and physical well-being, reductions in mortality, morbidity, and healthcare costs, and improvement in patient satisfaction and quality of life (Grove, Burns, & Gray, 2017).

Problem Statement

The practice problem addressed by this DNP QI initiative was lack of adherence to LSD restrictions, inadequate patient understanding of steps to achieve a LSD, and excessive 30-day readmissions. The QI team at Hospital A (a pseudonym) identified gaps in documentation compliance with teaching LSD to patients with CHF and a need to

reduce 30-day readmissions for CHF (White, Dudley-Brown, & Teerhar, 2016). Hospital A's multidisciplinary approach to patient teaching allowed for gaps in the delivery of LSD education and evaluation of teaching effectiveness.

Patients with a better comprehension of their health condition are empowered to make wiser self-care decisions, which may lead to a better quality of life (Riley, Gabe, & Cowie, 2013). Self-care decisions affect the healing process and reduce the speed at which the disease progresses (Riley et al., 2013). One aspect of LSD adoption is the consumption of foods with low levels of sodium (Riley et al., 2013). People with CHF must know how to read labels for sodium content, track sodium intake, and modify recipes to lower sodium content.

The registered nurse (RN) is responsible for teaching patients about their disease processes and lifestyle accommodations (Bodenheimer & Grumbach, 2016; Riley et al., 2013). Hospital A uses a multidisciplinary approach to teaching patients diagnosed with CHF about LSD restrictions. Although it is appropriate to delegate such tasks to other registered nurses and dieticians, this delegation caused role confusion and resulted in education gaps, which ultimately led to poorer health maintenance outcomes and high rates of 30-day readmissions (Bodenheimer et al., 2016; Riley et al., 2013).

The Centers for Medicare and Medicaid Services (CMS, 2018) reported that national healthcare expenditure (NHE) steadily rose to a high of $3.3 trillion in 2016, or 17.9% of the gross domestic product (GDP). NHE is projected to continue to rise at a rate that is 1% faster than GDP between 2017 and 2026 (by 5.5% per year) and reach 5.7 trillion (CMS, 2018). Recently, measures have been implemented to reduce health care

costs; however, expected outcomes were not as good as anticipated. The average hospitalization for CHF costs approximately $7,000, and Medicare reimbursement only covers $5,800; thus, hospitals incur a net loss of $1,200 with each readmission (Huntington, Guzman, Roemen, Fieldsend, & Saloum, 2013). In the US, medical expenses related to the care of patients with CHF are significant and reach roughly $32 billion each year (Stevenson et al., 2015), with approximately $17 billion charged to Medicare alone (Maliakkal & Sun, 2014). One factor which contributes to health care costs is preventable hospital readmissions. This economic impact led to the 2010 Patient Protection and Affordable Care Act (ACA) legislation and the formulation of the Hospital Readmissions Reduction Program (HRRP) in 2012 which imposed penalties on hospitals with higher readmissions rates (McHugh, Berez, & Small, 2013). One objective of the HRRP is to reduce the annual $15 billion in health care costs directly attributed to preventable readmissions (McHugh et al., 2013). The Department of Health & Human Services (HHS, 2014) called for a 10% reduction in readmissions for each age group of CHF patients. The CMS began to levy financial penalties in October 2012, decreasing Medicare reimbursement rates and withholding payments to healthcare organizations and providers who do not meet the target reductions in 30-day readmissions. These economic implications validate the significance of the problem; more importantly, it stresses the necessity to improve patient outcomes (McHugh et al., 2013).

Nurses have the skill set necessary to serve as coordinators of multidisciplinary teams to improve patient outcomes (Bodenheimer et al., 2016; Terry, 2015). However, implementation problems can result in patient education gaps (Bodenheimer et al., 2016;

White et al., 2016; Terry, 2015). This DNP QI project included analysis of Hospital A's QI data, educational content, and LSD teaching practices for adult patients. This QI project identified gaps and weaknesses in LSD teaching documentation, which may be contributing to higher than expected 30-day CHF readmission rates, and developed recommendations to improve deficiencies (Riley et al., 2013).

Purpose Statement

The gap in practice addressed by this DNP QI initiative was inadequate understanding of the steps necessary to achieve a LSD, lack of adherence to LSD restrictions, and excessive 30-day readmissions. The practice focused guiding question for this project was as follows: In adult patients with CHF, how did the LSD education method impact compliance with LDS, health outcomes, and 30-day readmission rates in the inpatient acute care setting? This DNP QI initiative attempted to address the gap in practice through analysis of QI data, evaluation of the educational processes and materials for adult patients with CHF, and the development and presentation of standardized, evidence-based recommendations for teaching LSD.

Nature of the Doctoral Project

The DNP QI project explored and developed a LSD standardized nursing education process to prepare patients with CHF to adopt a LSD, improve health outcomes, and reduce 30-day readmissions. The project included a retroactive evaluation of 12 months of Hospital A's QI data on 30-day CHF readmissions rates, Press Ganey patient satisfaction scores, and de-identified patient satisfaction reports. The project involved analysis of Hospital A's LSD education process for teaching LSD to adult

patients diagnosed with CHF. An evidence-based LSD teaching process was developed to correct the identified deficits.

Hospital A uses a customized electronic health record (EHR) system and standardized CHF care pathways that include teaching for LSD. Hospital A used a multidisciplinary approach to educate CHF patients about LSD. Each discipline had access to document patient education within the EHR system. The EHR system contains links to the CHF Care Pathways (diagnosis specific patient care guidelines), electronic policy and procedure manuals, electronic forms to record teaching interventions (with QI compliance reporting capabilities), and printable patient teaching materials. This electronic access facilitated the review of the teaching process, evaluation of patient learning outcomes, and lent itself to an audit of education compliance.

Collectively, this data was analyzed to identify issues with the effectiveness of the teaching process and patient compliance with LSD, which could be contributing to higher 30-day CHF readmissions. The QI project then developed evidence-based teaching materials and methods to correct identified deficiencies and presented those to staff nurses. To allow Hospital A to determine the effectiveness of the recommended interventions for addressing gaps in practice, a comparison of the above-listed findings from 12 months before the adoption of patient education changes to those at six and 12 months following implementation was recommended.

Significance

Stakeholders for this DNP QI project include patients, families, and caregivers who are directly impacted by the disease; political leaders, insurance companies, and

taxpayers who pay for medical care through social programs; healthcare providers, facilities, and staff who care for patients with CHF. This DNP QI project has the potential to positively impact the care, cost, and health outcomes of patients with CHF. Self-care is involved in both the prevention of disease and health maintenance; thus, this DNP project may be transferable to other practice areas requiring patient education, such as diabetes, kidney and cardiovascular diseases. The potential implications of this DNP project may result in positive social change and decreased costs, improved patient outcomes, and greater patient satisfaction.

There is an increased prevalence of CHF across the world making it an international public health concern. For instance, there are more than 5 million people with CHF in the US and approximately 23 million globally (Heidenreich et al., 2013). Additionally, Heidenreich et al. (2013) noted by 2030, about eight million more people are expected to have CHF, with a projected cost increase to $53 billion per year. Direct and indirect medical costs of managing people with CHF are expected to double with the current trend. Thus, there is an essential need to implement strategies to maintain health and sustain quality of life within the context of rapidly developing healthcare technologies that prolong the lives of people with CHF (Heidenreich et al., 2013).

In general, there are benefits associated with a modest reduction in sodium consumption. For instance, reduced CHF readmission rates should result in a decrease in healthcare-associated costs. Population-wide reduction in levels of sodium consumed is recommended by international health agencies such as the World Health Organization (WHO) and Pan-American Health Organization (PAHO). Also, governments and non-

government health organizations, as well as professional bodies, endorse a reduction in sodium intake across all populations, especially those diagnosed with CHF. Dietary modifications directed toward health issues reduce the risk factors associated with developing CHF, such as hypertension and obesity (Cogswell et al., 2016).

Summary

In relation to CHF, there is a need for patients to modify their lifestyle behaviors. Evidence shows that people who adhere to a LSD have an increased quality of life and reduced mortality. Potential for gaps in self-care knowledge were identified with the previous LSD education process. This DNP QI project focused on analyzing QI, internal electronic medical record (EMR) compliance reports, Press Ganey patient satisfaction scores, and de-identified patient satisfaction data to identify gaps in practice that are possibly contributing to increased 30-day CHF readmissions. This project focused on compiling best practice recommendations on how to best prepare patients with CHF to achieve a LSD and evaluate the effectiveness of LSD teaching interventions. The purpose of this project was to provide nurses with standardized and evidence-based education materials and processes for patients with CHF to attain compliance with LSD and reduce CHR 30-days readmissions. This project helps in the realization of a reduction in health care costs and improvements in patient outcomes.

Section 2: Background and Context

Introduction

The practice problem addressed by this DNP QI initiative is lack of adherence to LSD restrictions, inadequate understanding of the steps necessary to educate patients to achieve a LSD, and excessive 30-day readmissions. The guiding question is: In adult patients with CHF, how does the LSD education method impact compliance with low-sodium diet, health outcomes, and 30-day readmission rates in the inpatient acute care setting? The project attempted to address the gap in practice by analyzing QI data, developing standardized and evidence-based educational processes and materials for adult patients with CHF and presenting these to staff nurses. This section explores the concepts, models, and theories used throughout the project as well as, the relevance to stakeholders.

Concepts, Models, and Theories

Health Belief Model

Theories and models are used in healthcare to support competent education to empower patients to make wiser healthcare decisions, thus enhancing patient outcomes and increasing satisfaction. McEwen and Wills (2014) said that the health belief model (HBM) could help patients realize the risk to their health and the benefits of lifestyle changes. The HBM can be useful in nursing to understand the relationship between a person's opinions and how likely they are to comply with recommended therapies and lifestyle modifications. The model was initially advanced to explain why the US Public Health Service (PHS) screening programs were not successful (Jones et al., 2015). The

central concept of the HBM is for people to embrace a health behavior change, they must perceive a threat to their health and deem benefits outweigh the obstacles to modify their behavior. Health education focused on critical concepts of HBM can help patients with CHF perceive their vulnerability to the progressive aspects of diseases, recognize that they can positively impact the severity of their condition, and provide tools needed to overcome barriers and cues to act with self-efficacy (Huang et al., 2016). This model is useful in structuring patient education to achieve lifestyle changes.

The HBM holds a person accountable for their health. However, their outcome is influenced by knowledge, attitudes, beliefs, past experiences, and motivation, which have a significant effect on one's views towards a change in health behavior (Huang et al., 2016). Societal norms play a role in a person's perception of health and related conditions, because, social environment influences behavior. For example, support and advice from friends and family are essential to how one will respond. Persons whom patients perceive as valued sources of knowledge and organizations such as churches influence how patients will receive recommendations to change their lifestyle (Huang et al., 2016). When those whose opinions matter support a change in health behavior, there is a higher likelihood that a significant number of patients will embrace the recommended change.

Self-Care Deficit theory

Dorothea E. Orem's self-care deficit theory is a nursing theory that is based upon a patient's ability to adapt to their environment; thus, it can be used to assist a patient to become self-reliant in the management of CHF (Petiprin, 2015). Self-care encompasses

the practice of activities that are necessary for the person to maintain life, health, and well-being (Attaallah, Klymko, & Hopp, 2016; Petiprin, 2015). When a person is unable to sustain adequate self-care, and a health deviation occurs, then health intervention is required (Petiprin, 2015). The optimal goal of nursing care is to enable the patient and/or caregivers to gain and retain self-reliance with self-care (Attaallah et al., 2016). Nursing interventions for patients admitted with CHF include education to foster greater understanding of the pathological effects of their disease process and mastery of skills needed to perform self-care (Attaallah et al., 2016; Petiprin, 2015). Further, patients need help to accept their health conditions, identify self-care concepts to cope with the impact of their disease process, and recognize when and how to seek professional assistance (Attaallah et al., 2016; Petiprin, 2015).

Pathophysiology of Heart Failure and Retention of Sodium

The pathophysiology of CHF is multifaceted given it entails several neuro-humoral pathways that lead to the retention of sodium and water as well as hemodynamic and cardiogenic changes causing CHF symptoms (Arrigo, Parissis, Akiyama, & Mebazaa, 2016). The retention of sodium is mainly a result of the kidney's inability to expel dietary sodium due to a reduction in renal sodium filtration and irregularities in the reabsorption of sodium (Farquhar, Edwards, Jurkovitz, & Weintraub, 2015; Knudson & Cabrera, 2016). Structural myocardial damage often advances to the point where the heart cannot provide adequate blood flow to meet the body’s demands. This results in changes to cardiac preload and afterload, which is likely to incite compensatory mechanisms of the sympathetic nervous system, vasoconstriction, and retention of water

and renal sodium (Masarone et al., 2017). In this regard, necessary medications, diuretics, and calcium channel blockers might alter the appetite. LSD has been shown to change the intake of other micronutrients (Arrigo et al., 2016).

In order to sustain circulatory homeostasis, activation of regulatory systems is crucial. However, chronic neurohumoral initiation can become pathologic and contributes to progressive cardiac damage resulting in the excessive retention of fluids and sodium which are precursors of CHF (Masarone et al., 2017). This chronic compensatory neurohumoral activation is an independent forecaster of mortality.

Relationship between Sodium Intake and CHF

Sodium is a vital constituent of diet and is used to improve flavor and taste of food. Sodium also has the capability of enriching other flavors by masking chemical or metallic off-notes, increasing sweet tastes, and balancing overall flavor (Peters et al., 2017). Even though there have been advancements in the modern packaging of food, transportation, and storage, sodium still plays a vital role in the preservation of food (Rodrigues, Rosenthal, & Tiburski, 2016). Sodium serves as a preservative in many foods as it impedes the growth of microorganisms (Elorriaga et al., 2017).

An individual who seeks to attain LSD levels should be aware of sodium quantity used in processed foods; this can be a challenge given one cannot always ascertain the exact amount of sodium from package labels. There are hidden sources of sodium in baked foods including leavening agents, such as sodium bicarbonate. In processed foods, a significant amount of sodium is included in preparation before packaging (Elorriaga et al., 2017). In countries where sodium content is being regulated, new technologies such

as high-pressure cooking are being used and subjected to further research to reduce the sodium content in processed foods (Rodrigues et al., 2016).

Providers should embrace a comprehensive approach when educating patients about controlling dietary sodium to ensure adequate nutrient intake (Krim, Campbell, Cavie, & Ventura, 2013). This approach will increase the chances of good health given other dietary deficiencies are common in people with CHF such as folate, magnesium, vitamin E, zinc, and vitamin D (Krim et al., 2013). Adequate nutrition is crucial for individuals with CHF due to higher risks of developing electrolyte imbalances and micronutrient deficiencies (Krim et al., 2013).

In a systematic review of randomized, controlled trials, Albert et al. (2015), noted eight common components of post-discharge programs for patients with CHF that led to a significant reduction in the unexpected CHF readmissions: “telephone follow-up, education, self-management, weight monitoring, sodium restriction or dietary advice, exercise recommendations, medication review, and social and psychological support”. Albert et al. (2015) further noted that post-discharge programs that utilized specialty RNs had a more significant reduction in mortality and readmission rates. Hospital managers seeking methods to manage CHF readmissions by using an educational intervention may likewise discover this is a cost-effective approach to achieve better outcomes (Albert et al., 2015).

Educating Patients to Change Behavior

The American Nurses Association (ANA, 2015), suggested that nurses must safeguard the dignity of all patients, families, and communities and have the duty to

advocate for the needs of the same. The ANA Code of Ethics, Provision 4, sets patient instruction as both a standard of care and nursing obligation. Furthermore, Provision 1 establishes the liability for nurses to evaluate the level of patient's understanding to assure that patients can make self-care judgments vital to protect their health and general wellbeing (ANA, 2015).

It is essential that patients be knowledgeable enough to manage health conditions. Self-management requires patients to achieve and sustain behavior change to reduce the effects of long-term diseases (Huang et al., 2016). Healthcare providers and other stakeholders have a critical role in the creation and dissemination of health information (Huang et al., 2016). Family members, friends, and social networks might help the patient make proper choices (Attaallah et al., 2016).

Krim et al., (2013) explained that the implementation of standardized protocols for patient's education is essential in attaining LSD. Attaallah et al., (2016) noted LSD education must equip patients with the necessary information to enable them to make the appropriate decisions about their diet. The Agency for Healthcare Research and Quality (AHRQ, 2014) suggested that teaching methods that confirm understanding and offer an opportunity for remediation should increase satisfaction and improve outcomes. Attaallah et al., (2016) said most patients receive a single handout containing information on how to reduce fluid and sodium consumption; other educational approaches include predetermined diet plans and face-to-face education sessions.

Factors Influencing LSD Compliance in Heart Failure

Barriers to LSD compliance include the lack of accurate and adequate information, inadequate time to prepare low sodium food, poor taste and higher cost of low sodium food, social eating norms, and challenges in comprehending the LSD (Higgs & Thomas, 2016; Teixeira, Goulart, Busnello, & Pellanda, 2016). Family members play a significant role in an individual's choice of food (Higgs et al., 2016). Cooking and eating together are essential aspects of family social interactions and have a significant effect on what one consumes and respective quantities. For instance, Higgs et al., (2016) noted that levels of affection and the presence of conflict in a family affect LSD consumption. Those with CHF might be frustrated when family members do not understand and make an effort to help them achieve LSD. When family members consume tasty foods with high levels of sodium, those with CHF may feel isolated and join their loved ones to have a feeling of belonging (Higgs et al., 2016).

Sodium intake is influenced by factors which include sociodemographic as well as past medical history. After exploring a cohort of patients, Chung, Park, Frazier, and Lennie (2017) established that higher income and education levels, being female, and the presence of hypertension significantly increase chances of LSD compliance. The explanation of variation in gender is because women have a better comprehension of the physiologic results of sodium and are better at recalling the steps of reducing dietary sodium (Chung et al., 2017).

Attaallah et al., (2016) explored a cohort of older CHF patients and established many had significant cognitive challenges that reduced their ability to read a nutrition

table, and many lacked the health literacy to categorize foods into low and high sodium groups. Patients who had received prior counseling for dietary sodium performed considerably better on diet tests than those without any previous knowledge (Cogswell et al., 2016). Skill development, literacy levels, and education play a significant role in the capability to choose low sodium foods (Cogswell et al., 2016).

O'Connor et al. (2016), noted that CHF patients requiring readmission were often non-adherent to medications and diet; and were more likely to be young, male, have a higher body mass index, smokers, and have high blood pressure. Financial and social barriers, as well as patient attitudes towards the behavior change also affects adherence to LSD (Eshkoor, Hamid, Shahar, & Mun, 2016). Patients who do not comprehend LSD may be persuaded to teach themselves. Self-education may result in misconceptions; for instance, the opinion that the majority of sodium in the diet comes from table salt and/or failure to include the sodium content in medications (Chrysant, 2016). Adequate knowledge of sodium levels in foods does not assure observance to LSD. Teixeira et al. (2016) found that in people with hypertension, there was no association between self-reported adherence to LSD and basic sodium knowledge; suggesting other factors might be involved.

Reduced availability of lower sodium foods is a factor which affects LSD adherence (Mills et al., 2016). The taste of sodium substitutes is another factor which affects LSD adherence; as patients experience greater satisfaction when consuming tasty foods with higher sodium levels (Mills et al., 2016). Combining LSD with other dietary restriction is multifaceted and can become confusing (Chong et al., 2015). Kato et al.

(2016), established that patients who ate outside the home found it challenging to maintain LSD. One cannot be sure of sodium levels in restaurant foods and may not have a variety of LSD items from which to choose. Therefore, patient education is essential to ensure that those diagnosed with CHF have adequate information to make the right choices despite the social circumstances.

Relevance to Nursing Practice

According to Healthy People 2020, there is a need to reduce hospitalizations for people diagnosed with heart-related conditions such as CHF. The initiative set by Healthy People 2020 is to achieve a 10% reduction in health care costs and readmissions (Healthy People, 2014). The target is 8.8 readmissions per 1,000 persons, and the expectation is that by facilitating self-care, the US can reach this target (Healthy People, 2014). In a study conducted by Brock et al. (2013), 30-day hospitalization readmission rates per 1,000 patients were 15.21%. The researchers classified 67% of the readmissions as avoidable if the patients had adhered to their plans of care (Brock et al., 2013).

In self-care management, nurses are the primary providers of education to patients (Attaallah et al., 2016). This QI project enables healthcare practitioners such as nurses, dieticians, physician assistants, and physicians to understand how best to educate patients about LSD and other chronic conditions. There is a need to reduce repeat hospitalizations and associated effects of CHF such as mortality rates. Helping families and patients to manage chronic conditions is an important initiative that has been given considerable attention by healthcare stakeholders; many patients with long-term health conditions have limited health literacy about their self-care needs (Liou et al., 2015).

Some patients with CHF are unable to contribute to the decision-making process due to cognitive changes; consequently, they require help to manage their conditions (Liou et al., 2015).

Standardized patient care pathways and teaching materials that are integrated into the EHR system are strategies that have been utilized to address gaps in practice with chronic conditions such as CHF to implement evidence-based practice and quality metrics. This DNP QI project has the potential to help Hospital A and other healthcare facilities implement evidence-based practice guidelines for LSD teaching to patients with CHF and other chronic conditions. The project's focus on patient education can reduce the number of CHF 30-day readmissions and consequently health care costs and improve patient outcomes.

Local Background and Context

The importance of Hospital A to the community is documented within an economic impact report, made available to this learner via the Hospital A intranet. The economic impact report describes the facility as a level 3 trauma center serving both general medical and surgical needs of the surrounding population. According to the American Hospital Association, Hospital A is a not-for-profit, church-operated hospital, (AHA, 2014). Hospital A employees roughly 400 full-time and 100 part-time registered nurses as well as, more than 50 full-time and four part-time licensed practical nurses. Hospital A employed roughly 1,700 non-nursing coworkers and over 200 physicians, served nearly 60,000 emergency patients, performed approximately 7,500 surgical

procedures, and provided about $9 million in uncompensated charity care in the fiscal year 2011 (AHA, 2014).

Hospital A's intranet accessed mission, vision, and unchanging coworker values each enhance the probability of success for this QI project. Hospital A's is a faith-based facility; whose mission emphasizes the calling to a healing ministry that provides for both care and outstanding service; while the vision highlights a model of care with a goal to "get health care right." The unchanging coworker's values at Hospital A include dignity, excellence, justice, service, and stewardship. Coworkers of Hospital A have access to an anonymous internal system to report any concerns. Thus, the internal documents promote a philosophy that supported the QI goals of this project.

This state's Department of Hospitals (2014) reports that Hospital A holds accreditation by the Joint Commission (JCAHO), which emphasizes a system of continuous operating enhancements to provide safe, high quality, treatment and services (Kelly, 2017). A community-focused strategic plan, made available to this learner via the Hospital A intranet, states Hospital A stands upon the firm foundation of its mission, vision, and co-worker values. Hospital A's internal Quality/Risk/Safety department provides feedback into hospital-wide policy and procedure development. Internal policies are established in a system of multidisciplinary pooled authority which provides further evidence of Hospital A's efforts to meet JCAHO quality standards. The internal policies and procedures stipulate Hospital A actively employ both the quality assurance and performance improvement (QAPI) structure and reporting process and the plan-do-check-act (PDCA) methodology for all quality/performance improvement initiatives.

Current financial disincentives (McIlvennan, Eapen, & Allen, 2015) coupled with Hospital A's culture resulted in a willingness of leaders to back the QI initiatives such as this DNP project (White et al., 2016).

Many reforms in the healthcare sector aim at reducing readmissions rates and healthcare expenditures, as well as improving patient outcomes (Healthy People, 2014). Even with careful discharge planning, there continued to be increased rates of 30-day readmissions for CHF and other chronic diseases. The high 30-day readmission rates are often attributable to a lack of knowledge about how to manage chronic conditions and associated symptoms, difficulty in obtaining or keeping follow up on appointments, and poor quality self-care (Healthy People, 2014).

People with chronic diseases like CHF are frequently branded as noncompliant, which may result from the inability to follow self-care recommendations (Doris, 2016). Limited self-care skills challenge even the best recovery plans, threatens health maintenance of chronic conditions, and increases rates of hospital readmissions (Doris, 2016). Recurring hospitalizations may be avoidable with proper interventions such as educating patients, adopting a LSD, counseling, and additional medications. Healthcare interventions should minimize the number of times patients need to visit their doctor or hospital, which will reduce costs (Stevenson et al., 2015).

Healthcare costs related to CHF readmissions represent a considerable portion of healthcare expenditures both in the United States and across the globe (Mosalpuria et al., 2014). At the community level, this expenditure transfers to taxpayers by way of absorption and cost sharing for non-reimbursed medical care. Meanwhile, the financial

and physical tolls of repeated exacerbations impact the patient and family due to overall health deterioration and reduced quality of life (Stevenson et al., 2015).

Government agencies and other stakeholder organizations have developed guidelines on sodium intake for both the general population and patients with CHF. However, ongoing nutritional research, rapid global lifestyle changes, and the endless possible combinations of comorbidities complicate efforts to develop a standardized recommendation for LSD. Existing evidence supports decreasing sodium to a level of two to three grams per day for overall health benefits (Krim et al., 2013).

Role of the DNP Student

The DNP student worked alongside and received data from Hospital A's QI Department staff during this DNP project. The DNP student worked with QI staff and utilized identified project objectives to analyze and synthesize the data. Hospital A's internal quality reports, 30-day readmission data, and the education processes and content were evaluated. Gaps in teaching compliance and weaknesses in the LSD educational materials and processes were identified by the DNP student and QI staff. The DNP student and the QI Department staff ensured the project aligned with existing ethical principles. The DNP student then used project objectives to guide the development of evidence-based LSD teaching processes and materials needed to achieve desired patient outcomes.

The DNP student's motivation for this doctoral project stem from academia and best practices related to conducting nursing education. This DNP student experienced the suffering of both a maternal grandmother and mother-in-law whom each died from CHF.

Lastly, as a patient with chronic kidney disease, this DNP student has hands-on experience with the challenges and benefits encountered in the adoption of a LSD.

Before undertaking this project, the DNP student considered potential bias. After receiving a diagnosis of stage 3 renal disease, this DNP student received a single page teaching sheet from the nurse who was responsible for teaching about LSD. The teaching sheet consisted of a short list of only categories of foods to avoid and those to choose. Even though this DNP student possesses culinary abilities and knowledge of nutrition; the task of adopting a LSD with low potassium restrictions was complex; much additional research was necessary for this student to be successful. This DNP student encountered numerous healthcare providers and nurses who automatically label many of their patients as non-compliant after they suffer an exacerbation; this DNP student understands the challenges of these patients. This DNP student endeavored to encourage such healthcare providers to consider that patients cannot justly be labeled non-compliant if they lack awareness of how to attain and maintain a LSD. This DNP student hoped that this identified bias would serve as an asset to the project.

Summary

In relation to CHF, the HBM can be useful in nursing to understand the relationship between a person's opinions and likely compliance with recommended therapies and lifestyle modifications. Health education can help patients with CHF to recognize their susceptibility to the disease, appreciate their ability to impact the severity of their condition and provide resources needed to overcome barriers to self-care (Huang et al., 2016). Orem's self-care deficit theory also supported this QI project in regards to

helping patients gain self-reliance in the managing CHF (Petiprin, 2015). Self-care encompasses the knowledge a patient will require to adopt a LSD (Attaallah et al., 2016; Petiprin, 2015). Self-care also encompasses the appreciation of personal benefits of preserving life, health, and well-being and the practice of the activities necessary to recognize and overcome barriers to maintaining a LSD (Attaallah et al., 2016; Petiprin, 2015). When a patient has been unable to sustain adequate self-care, and a health deviation occurs, the nurses should evaluate to determine if further teaching may be required (Petiprin, 2015). This DNP QI project developed standardized, evidence-based teaching processes and materials and made recommendations to prepare nurses better to teach patients with CHF to achieve a LSD. This project helps to improve patient self-care abilities and patient outcomes by decreasing 30-day readmissions.

Section 3: Collection and Analysis of Evidence

Introduction

This section outlines the procedures adopted for the DNP QI project. The practice-focused questions that guided the QI project are highlighted. The sources of QI evidence and educational compliance data analyzed are included. Further, an analysis and synthesis section is presented outlining the data analysis techniques, and a summary is provided.

Practice-focused Questions

The research question for this project is: In adult patients with CHF, how did the LSD education method impact compliance with low-sodium diet, health outcomes, and 30-day readmission rates in the inpatient acute care setting? The project addressed the gap in practice by developing evidence-based educational processes and materials for adult patients with CHF and presenting these to staff nurses. Nurses have the skill set to serve as coordinators of care of multidisciplinary teams of healthcare workers and to improve patients' outcomes (Bodenheimer et al., 2016). However, patients may fail to receive the teaching necessary to adopt a LSD due to implementation errors (Bodenheimer et al., 2016; White et al., 2016).

Sources of Evidence

Data needed for this DNP QI project is routinely monitored by the QI Department of Hospital A. The hospital employs a multidisciplinary approach to teaching patients with a diagnosis of CHF about LSD. Although it is appropriate to entrust such tasks to other nurses and dieticians, the responsibility for the teaching, evaluation, and outcome is

retained by the registered nurse. Implementation errors occurred due to confusion about who would complete the teaching task; this may have ultimately lead to poorer health outcomes and higher 30-day readmissions. Internal documents provided to this DNP student, show Hospital A uses a reporting structure which directly interacts with their EHR system; this allowed the facility to track 30-day readmissions by diagnosis as well as compliance with patient education. Hospital A also participates in de-identified patient satisfaction surveys which contain items related to satisfaction with the nurse-delivered education; these surveys allowed for evaluating patient perceptions about the effectiveness of teaching interventions.

The teach-back method is one evidence-based approach to ensure that the nurse was successful at delivering patient education sufficient to allow the development of self-care skills (ARHQ, 2014). After a teaching session, the participant is asked to repeat back crucial points of the instruction in their own words (Attaallah et al., 2016; ARHQ, 2014). If the participant's response indicates a lack of comprehension or a need for clarification the patient educator can repeat the teaching (Attaallah et al., 2016). This cycle repeats until the nurse's evaluation reveals that the participant demonstrates a grasp of the essential portions of the content (Attaallah et al., 2016).

The teach-back method is not an evaluation of a recipient's knowledge as much as an examination of how well the nurse has taught the content and the quality of the content (Attaallah et al., 2016; ARHQ, 2014; Mahramus et al., 2014). Teaching back does not require any specific level of literacy; this process enables those with a low knowledge level to actively participate in their education process and repeat the information until it is

understood (Mahramus et al., 2014). According to Mahramus et al., (2014), 43.1% of patients required reteaching and 98.3% were competent after remediation. The teach-back method is beneficial in helping patients with chronic diseases comprehend treatment schedules, symptoms, and how to perform self-care (Attaallah et al., 2016; Mahramus et al., 2014). Mahramus et al., (2014) used a quasi-experimental design, with repeated measures (before, immediately after, and three months after) to determine nursing knowledge for providing patient teaching regarding chronic. Nurses participating in the study demonstrated knowledge deficits in teaching self-care concepts to patients with CHF. The teach-back method demonstrated a significant improvement in nursing knowledge of teaching CHF self-care abilities with an increase from the pre-test (65.1%), immediate post-test (80.6%), and 89.5% for the follow-up post-test (Mahramus et al., 2014).

The DNP student evaluated the education materials, policies and procedures related to patient teaching and documentation, as well as compliance reports made available by the QI department staff. This QI analysis of Hospital As patient teaching process will follow the same Quality and Safety Education for Nurses (QSEN) concept of patient-centered care and nursing diagnosis outlined by Ackley, Ladwig, and Flynn-Makic (2017). The patient and their family should be a full partner in their healthcare regime, and this requires the knowledge needed to participate in shared decision-making and planning to integrate their therapeutic regimen into their daily lives. A patient who has been newly diagnosed with CHF and recently prescribed a LSD is more likely to fall under the North American Nursing Diagnosis Association-International (NANDA-I)

diagnosis of ineffective health management, ineffective family health management, or readiness for enhanced health management. These nursing diagnoses suggest nursing outcomes classification (NOC) related to health-promoting behaviors and nursing interventions classifications (NIC) related to patient education. Patients who are readmitted with a CHF exacerbation are more likely to fall under the NANDA-I diagnosis of ineffective health management, which is not the same as noncompliance. The Ackley et al., (2017) recommended NIC for ineffective health management include the application of the HBM and helping the patient develop health literacy (pp 444-445). Thus, an assessment of the patient's baseline knowledge will be essential in determining the correct nursing diagnosis and collaborating with the patient to develop appropriate interventions to meet their health goals. Likewise, the outcome of the current and previous educational interventions must be evaluated to reach a correct nursing diagnosis; otherwise, the patient may be inaccurately judged as non-compliant.

The Heart Failure Society of America (HFSA, 2013) emphasized the need for patients to develop the health literacy and skills required to integrate a LSD into their everyday life. The HFSA begins by introducing what a LSD consists of and the necessary steps to follow dietary restrictions. The next skills that are taught are how to interpret a nutrition label and how to track their daily sodium intake. Patients are taught other skills such as how to modify favorite recipes to fit a LSD and strategies for following dietary restrictions when eating outside the home.

The DNP student evaluated the teaching materials for the inclusion of techniques such as the teach-back method. The DNP student also reviewed the LSD education

materials supplied by the QI department for the adequacy of information about the CHF disease process, causes, signs and symptoms of disease progression, and treatment interventions. The DNP student determined adequate information was not provided to enable patients with CHF to relate how they acquired the disease and match disease causes with treatment interventions. The inclusion of crucial information to allow patients to comprehend the steps needed to prevent complications, recognize an exacerbation, and recognize when to seek professional assistance was included.

In line with the project's focus, the DNP student evaluated the education materials for adequacy of information on how to implement and maintain a LSD. Content on how CHF is related to sodium intake is necessary for patients to attain a LSD. The teaching materials should include customizable information entry fields for daily sodium intake in order that instruction can be individualized to match the provider's recommendations based on a specific patient's comorbidities. Information on dietary sources of sodium and opportunities to practice how to read food labels and track daily sodium intake are needed to help patients master the skills required to achieve their recommended level of sodium (Mills et al., 2016).

Analysis and Synthesis

The DNP student and QI staff analyzed 12 months of compiled QI and education compliance data and identified that gaps and deficiencies in the LSD education process and materials, which were likely contributing to higher 30-day readmissions for CHF. Readmission rates of patients with CHF before implementation of changes to the education process, compliance with education, and patient satisfaction with teaching

should be compared in a pre/posttest fashion. This data is regularly extracted monthly from the Hospital A's EHR by the QI department staff. In order to compare Hospital A's performance to the broader field of nursing, this DNP student collected QI data by the same age groups used in the National Hospital Discharge Survey. Baseline measurements as recorded by the National Hospital Discharge Survey in 2007, revealed the following rates of CHF hospitalizations per 1,000 populations: 10.4 for ages 65-74 years, 23.4 for ages 74-84 years, and 38.7 for ages 85 years and older (HHS, 2014). Hospital A's data can be grouped according to age sets and comparisons made.

Descriptive and inferential statistics were used to analyze Hospital A's data. As with Sow (2014), a similar analysis of variables upon human development, measures of central tendency were used to extract meaningful summaries from the data; in particular, the average/means (M), minimum (Min), maximum (Max), median, mode, frequencies, and standard deviation (SD) were used. The DNP student used analysis of variance (ANOVA) to explore the efficiency of the education program at achieving short and long-term objectives and the effectiveness of any recommended changes to the education program. The DNP student analyzed QI department provided reports of systolic blood pressure, diastolic blood pressure, and daily weights of patients with CHF, along with 30-day readmission rates, patient education compliance, and patient satisfaction to guide any recommendations. The DNP student recommended the QI Department continue to monitor this baseline data at six months and 12 months after implementation to determine the effectiveness of any implemented changes to the education program.

Summary

This section highlights the practice-focused question and the sources of evidence. The QI Project focused on evaluating and revising Hospital A's LSD education program to reduce CHF 30-day readmissions and improve patient outcomes related to LSD compliance. The DNP student analyzed the baseline data and teaching materials supplied by the QI Department of Hospital A. The DNP student used descriptive and inferential statistics to analyze for possible links in 30-day readmission rates and the LSD discharge teaching process. The DNP student recommended that QI Department staff continue to monitor incoming data and make comparisons to the baseline data to determine the effectiveness of the implemented interventions at six months and 12-month intervals. The measures of central tendency were used to extract meaningful summaries while ANOVA was recommended to explore the efficacy of changes to the LSD education program.

Section 4: Findings and Recommendations

Introduction

The local practice problem addressed by this DNP QI project is lack of patient adherence to LSD restrictions, inadequate nursing knowledge of the steps necessary to train patients to achieve a LSD, and 30-day readmissions (Cogswell et al., 2016). The guiding question is: In adult patients with CHF, how does the LSD education method impact compliance with low-sodium diet, health outcomes, and 30-day readmission rates in the inpatient acute care setting? The project addressed the gap in practice by analyzing QI data, developing standardized and evidence-based educational processes and materials for adult patients with CHF and presenting these to staff nurses. The DNP student assisted the QI staff in analyzing 12 months of compiled reports with demographic, medical history, assessment findings, nursing interventions, and medical treatment information from patients who were readmitted within 30 days of discharge with a primary diagnosis of CHF to identify possible variables of interest. Hospital and nursing level variables analyzed included: 30-day readmission rates, compliance with LSD patient education and daily weights, and patient satisfaction to guide any recommendations. Possible patient-level variables analyzed included: Age, sex, last recorded systolic and diastolic blood pressures, weight change during hospitalization, and comorbidities. Descriptive (central tendency and spread) for a significance value of $< .05$ was used to describe the population and inferential statistics (distribution, t-test, and ANOVA) were used to conclude which intervention for the project. The following

section describes the findings and implications, recommendations, and the strengths and limitations of the project.

Findings and Implications

Heart Failure 30-Day Readmit Population

According to Hospital A's internal QI reports, Hospital A had a total of 499 CHF admissions for the year with a total of 93 readmissions (out of a population of 499). Hospital A's monthly CHF readmissions ranged from a minimum (Min) rate of 12% in June to a maximum (Max) rate of 26% in January with an average/mean (M) of 19%. The average number of days before readmission was 12.37 (Min 1, Max 30, SD 7.77). Table 1 provides the International Classification of Disease (ICD) codes for this population. Hospital A is one unit of a system of hospitals and one of three competing hospitals in its service region. Hospital A has identified a need to reduce its 30-day readmissions for CHF. Thus, this DNP project has the potential to improve outcomes at the system and institution level for Hospital A and could be applied system-wide.

Hospital A's internal reports indicate the indexed length of stay (LOS) averaged 5.78 days (Min 1, Max 18, SD 4.06) with an average readmission risk score of 10.23 (Min 1, Max 18, SD 3.811). A limitation of using this data set is its inability to compare variables from CHF patients who were not readmitted; this could limit the ability to detect possible points of intervention. A cardiologist was on the care team for 31% of the readmissions (SD 0.46), and the average time until physician follow-up or readmission was 14.24 days. Pearson's two-tailed bivariate correlation revealed a moderate positive correlation between readmission risk scores, r(91) and the following comorbidities:

Diabetes Mellitus (= .618, p < .001) coronary arterial disease (= .559, p < .001), obesity (= .668, p < .001), and chronic atrial fibrillation (= .533, p. < .001). The dataset indicates a low negative correlation between the number of days to before readmission, with r(91), and both follow-up with the primary care physician (= -.34, p 0.58, ns) and patients who were discharged with a prescription for an Angiotensin-converting enzyme (ACE) inhibitor (= -.336, p < .001).

Table 1

Frequencies of ICD Code for CHF 30-Day Readmissions with Descriptions (N = 93)

ICD Code	*f*	*Rel f*	*cf*	*Percentile*	*ICD Description*
113.0	3	0.03	93	100.00	Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
150.1	1	0.01	90	96.77	Left ventricular failure
150.2	1	0.01	89	95.70	Acute systolic congestive heart failure
150.2	4	0.04	88	94.62	Acute or chronic systolic congestive heart failure
150.3	1	0.01	84	90.32	Acute diastolic congestive heart failure
150.3	1	0.01	83	89.25	Chronic diastolic congestive heart failure
150.3	7	0.08	82	88.17	Acute or chronic diastolic congestive heart failure
150.4	1	0.01	75	80.65	Acute combined systolic congestive and diastolic congestive heart failure
150.4	5	0.05	74	79.57	Acute or chronic combined systolic congestive congestive and diastolic congestive heart failure
404.1	1	0.01	69	74.19	Malignant hypertensive heart and kidney disease with heart failure and with chronic kidney disease stage I through stage IV, or unspecified
428.0	3	0.03	68	73.12	Congestive heart failure, unspecified
428.2	22	0.24	65	69.89	Acute or chronic systolic heart failure
428.3	4	0.04	43	46.24	Acute diastolic heart failure
428.3	1	0.01	39	41.94	Chronic diastolic heart failure
428.3	30	0.32	38	40.86	Acute or chronic diastolic heart failure
428.4	8	0.09	8	8.60	Acute or chronic combined systolic and diastolic heart failure

Patient-Related Variables

Patient age, sex, last documented systolic and diastolic blood pressure, weight change during the indexed hospitalization, and the total number of comorbidities were analyzed. Possible patient-related variables analyzed are summarized in Table 2. Pearson's two-tailed bivariate correlation revealed a low positive correlation, with r(91), between the last recorded systolic and diastolic blood pressures of the indexed hospitalization (= .462, p < .001). There was a negligible positive correlation with the number of days in terms of readmission for sex (= .167, p 0.111, ns), last systolic (= .006, p 0.953, ns) or diastolic (= .02, p 0.847, ns) blood pressures. This DNP student expected to find a correlation between weight change during the indexed stay and the number of days to readmission; however, this was not the case. This DNP project has the potential to reduce CHF exacerbations and improve quality of life.

Table 2

Patient Related Variables

Variable	*M*	*Min*	*Max*	*SD*	*Mode*	*Median*
Age (years)	75	45	97	13.3	77	77
Last Systolic	124	81	184	22.7	109	119
Last Diastolic	72	37	90	9.9	65	67
Weight Change (kg)	-2.4	+8.6	-22.7	-5.5	0.0	-1.6
Total Comorbidities	4	0	6	1.5	4	4

Nursing Related Variables

QI data.

Possible nursing-related variables analyzed include compliance with documenting patient weights (73%) during the indexed hospitalization and patient teaching for CHF

(85%), LSD (78%), and fluid restriction (41%). Pearson's two-tailed bivariate correlation revealed no correlation, with r(91) between the number of days to readmission and documentation of patient teaching for CHF (= .47, p < .001), LSD (= -.002, p 0.982, ns), or fluid restriction (= -.113, p 0.279, ns). A negligible negative correlation between the frequency of emergency room visits in the six months prior to the indexed hospitalization and patient teaching for CHF (= -.209, p 0.044) and LSD (-223, p 0.032) was noted. The failure of the data to demonstrate a correlation between patient education and the patient's ability to provide self-care suggests patients may not comprehend their disease process or have mastered the skills needed to adopt or maintain a LSD.

Patient satisfaction.

Press Ganey Surveys with integrated Hospital Consumer Assessment of Healthcare Providers and System (HCAHPS) items provide the means to evaluate patient satisfaction with the education provided by the nurse (survey questions 1-3, and 16-17). Figure 1 illustrates a comparison of Hospital A's satisfaction ratings with state and national levels. Hospital A's satisfaction ratings were 81% for general nursing communication, 64% for teaching about new medications, 88% for receipt of written discharge teaching, and 55% for strong agreement with understanding self-care needs. These ratings strongly suggest a need to evaluate Hospital A's teaching processes for educating adult patients with CHF on how to adopt a LSD.

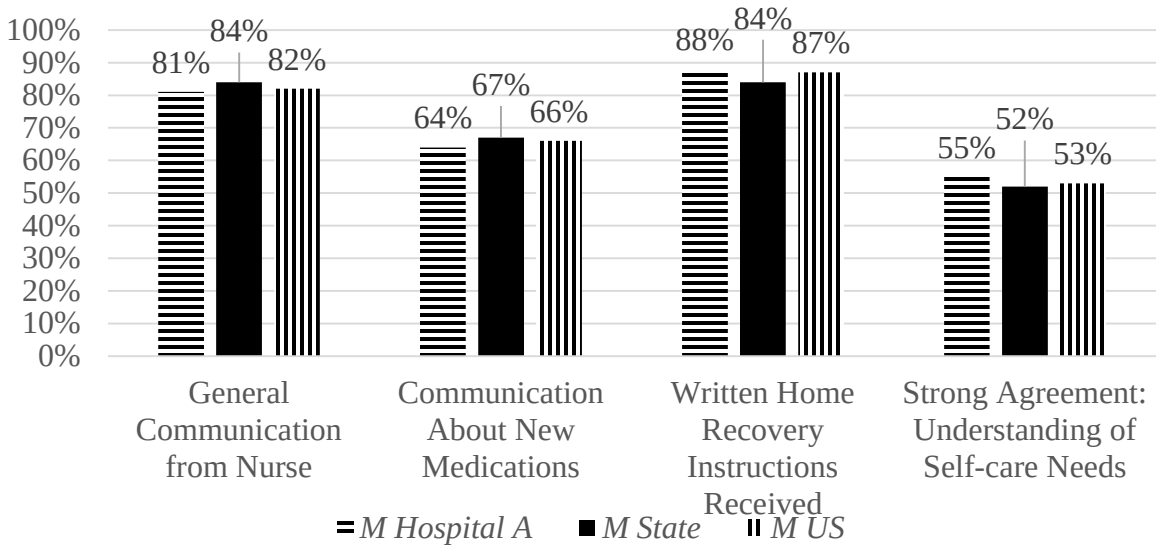


Figure 1. Press Ganey with HCAHPS: Patient satisfaction with nursing communication

LSD teaching procedures.

Despite the presence of standardized patient care pathways and teaching materials contained within the EHR system, gaps in -practice persist, as evidenced by the internal QI compliance data. ANOVA of the compliance with teaching LSD was analyzed for the potential impact upon days to readmission (Sow, 2014). The hemogeneity of variances was not violated, as assessed by Levene test for hemogeneity of variance (p = .208, ns) and the Welch statistic (= .291, p .831, ns) indicates the groups have hemogenous variance. The ANOVA results led the DNP student to conclude that there is no significant difference in patient education compliance upon days to readmission, F(3,89) = .314, p .815, ns).

A review of hospital A's standardized teaching materials found a lack of a method to objectively assess the patient's level of comprehension of the content, such as a teach-back method. Further analysis of the teaching materials revealed a lack of any means for

a patient to practice comparing the content of sodium to recognize lower and higher food options, or from tracking daily intake of sodium. Furthermore, the teaching materials offered no instruction in recipe modification to lower sodium content while maintaining an appealing taste.

Documentation of the teaching process includes evaluation of patient understanding; however, the most commonly documented response to teaching was verbalized understanding and denies questions. Since LSD teaching is regularly included as part of the discharge teaching, there is no opportunity to observe patient outcomes. Together this teaching process lacks an effective means of evaluating the nursing intervention of patient teaching for LSD. This lack of follow through with the nursing process may lead to poor patient understanding of their self-care and disease management needs, an inability to adopt a LSD, CHF exacerbations, and increased 30-day readmissions. Thus, this DNP project has the potential to improve patient outcomes and contribute to a positive social change for this patient population and other who require dietary modifications for chronic diseases.

Recommendations

This DNP project focused on educating nurses to teach a patient with CHF to adopt a LSD. The DNP student recommended that every adult patient with CHF receive evidence-based discharge teaching that includes several opportunities for the nurse to evaluate their level of understanding of the content and to reteach as necessary (Attaallah et al., 2016; ARHQ, 2014). The teaching materials should be standardized, yet be customizable before printing for the patient's required level of sodium restriction. The

teaching materials shall include a listing of complementary herbs to replace salt in a recipe while maintaining a pleasing flavor (Mills et al., 2016).

In order to increase the patient's comprehension of the metric unit of measure, the DNP student recommends the inclusion of a currency based method for tracking daily sodium intake. For instance, if a patient requires a 1500 mg sodium restriction, the patient's daily sodium budget would be $15.00; a penny would represent each milligram of sodium. The teaching materials should include a sample menu and nutrition fact labels for both lower and higher sodium option for each food choice (Attaallah et al., 2016; ARHQ, 2014). The teaching materials should include questions that require the patient to calculate both a running total and remaining sodium balance after each meal choice to practice the skills needed to track daily sodium intake (Attaallah et al., 2016; Petiprin, 2015). The teaching tool developed for this DNP project is located in Appendix A (page 48).

The QI data and de-identified patient satisfaction surveys indicate a gap in practice accompanied by lower than expected level of patient satisfaction with their self-care teaching materials. The DNP student recommends that this data along with 30-day readmission rates serve as a comparison to determine the effectiveness of the new teaching process at six and 12 months after implementation. The DNP student expects patient satisfaction with the teaching process and their confidence to perform self-care will improve.

Strengths and Limitations of the Project

One strength of this DNP project is its transferability to other patient populations with chronic diseases requiring dietary restrictions. The Chief Nursing Officer served as a preceptor during the project and promoted the project to the QI department and nursing staff. Hospital A's culture of QI and service benefited this project. This DNP project will positively impact nurses by preparing them to apply the nursing process to better prepare patients to adopt a LSD. Active involvement of nurses caring for patients with CHF will yield greater patient confidence in their self-care abilities and improved patient outcomes. Hospital A's EMR system with integrated patient education adds strength to this DNP project, as it serves as a platform from which to implement and monitor the outcome of the project. Hospital A will benefit by achieving improved patient outcomes and a reduction in non-reimbursed health care services. The population will gain an increase in knowledge about how to adopt dietary restrictions and greater confidence in their self-care and self-management of chronic disease abilities; thus, they will benefit from a reduction in health care costs.

One limitation of this DNP project includes a lack of a data CHF patients who were not readmitted within 30-days to serve as a comparison group. Another limitation is the small population of patients, which may limit the ability to transfer this project to other populations. A third limitation of this DNP project is that the 30-day CHF readmission dataset used is all-cause; this may skew the data by adding readmissions for other causes. After the implementation and evaluation of project outcomes, this DNP

student recommends expanding the teaching process to the other Hospital A system hospitals.

Section 5: Dissemination Plan

Dissemination Plan

The findings of this DNP project were disseminated to key stakeholders in Hospital A's nursing leadership team. With support from the nursing leaders, the DNP project teaching materials were developed and disseminated to staff nurses of Hospital A as an in-service. A PowerPoint presentation was developed to highlight the key findings and outline changes in the process for any nurses who were unable to attend the in-service and for onboarding education of new staff (see Appendix B). An electronic version of the teaching materials will be disseminated via Hospital A's EMR system for nurses to use for educating their patients.

Any clinicians who are responsible for patient teaching on dietary restrictions could benefit from this DNP project. Dissemination of the DNP project to the nursing profession will be done via a peer-reviewed international nursing journal, such as the *Journal of Clinical Nursing* (*JCN*). Wylie (2018), said patient-centered, evidence-based teaching practices and works studying processes that impede delivery of nursing excellence are subjects favored by *JCN*.

Analysis of Self

This DNP project has afforded multiple opportunities to increase the following skills sets: Nursing research, ongoing QI, statistical analysis, nursing education scholar for curriculum design, and project management. The present state of nursing practice for conducting patient education for LSD has several identified weaknesses, including non-compliance with teaching, inadequate evaluation of learning outcomes, and lack of

follow through with the nursing process. The long-term goal of this DNP project aligns with this student's professional role. As nursing educators are life-long learners, it is important to focus on educating student nurses on how to teach patients about dietary restriction and contribute to the nursing profession. The ultimate goal is to improve patient outcomes through nursing interventions, via patient education.

This DNP project presented many challenges, including gaining access to various types of QI and EMR reporting tools, and learning to code raw data for compatibility with the Statistical Package for Social Sciences (SPSS). This DNP student found increase confidence in the ability to develop relationships with key stakeholders in order to gain support for the project. Another challenge involved overcoming barriers related to experienced nurses being asked to change their patient education practices. The major insight gained during this DNP project was the discovery of an opportunity to improve patient outcomes through research, nursing education, and dissemination.

Summary

This section described the dissemination plan for this DNP project and self analysis of this student's roles. CHF is a chronic and progressive disease that significantly impacts the health and quality of life of patients. A key measure of healthcare quality and outcomes for this patient population remains the 30-day readmission rates. The gap in nursing practice identified by this student involved a lack of nursing consistency in completing patient education for LSD and a lack of an objective means to evaluate the patient's understanding of the content. This student developed a standardized, patient-centered, and evidence-based teaching tool for educating patients

about how to adopt a low sodium diet. Patient education has proved effective at improving patient outcomes and reducing 30-day readmissions. This project validates the need for bedside nurses to become content experts and to use a methodology to confirm patient understanding of their dietary management and self-care needs.

References

Ackley, B. J., Ladwig, G. B., & Flynn-Makic, M. B. (2017). *Nursing diagnosis handbook: An evidence-based guide to planning care.* (11th ed.). St. Louis, MO: Elsevier.

Agency for Healthcare Research and Quality (2014). The SHARE approach—Using the teach-back technique: A reference guide for health care providers. Retrieved from http://www.ahrq.gov/professionals/education/curriculum-tools/shareddecisionmaking/tools/tool-6/index.html

Albert, N. M., Barnason, S., Deswal, A., Hernandez, A., Kociol, R., Lee, E., ... & White-Williams, C. (2015). Transitions of care in heart failure: A scientific statement from the American Heart Association. *Circulation: Heart Failure*, 8(2). 1-36. doi:10.1161/HHF.0000000000000006

American Nurses Association. (2015). Code *of ethics for nurses with interpretive statements.* Retrieved from http://www.nursingworld.org/MainMenuCategories/EthicsStandards/CodeofEthicsforNurses/Code-of-Ethics-For-Nurses.html

Attaallah, S., Klymko, K., & Hopp, F. P. (2016). Self-care among older adults with heart failure. *Gerontology and Geriatric Medicine, 2*, 1-10. doi:10.1177/2333721416684013

Amaral, D. R. D., Rossi, M. B., Lopes, C. T., & Lopes, J. D. L. (2017). Nonpharmacological interventions to improve quality of life in heart failure: An

integrative review. *Revista Brasileira de Enfermagem, 70*(1), 198-209. doi:10.1590/0034-7167-2016-0112

Arrigo, M., Parissis, J. T., Akiyama, E., & Mebazaa, A. (2016). Understanding acute heart failure: Pathophysiology and diagnosis. *European Heart Journal Supplements, 18,* 11-18. doi:10.1093/eurheartj/suw044

Bodenheimer, T. & Grumbach, K. (2016). *Understanding health policy: A clinical approach* (7th ed.). New York, NY: McGraw-Hill.

Brock, J., Mitchell, J., Irby, K., Stevens, B., Archibald, T., Goroski, A., & Lynn, J. (2013). Association between quality improvement for care transitions in communities and rehospitalizations among Medicare beneficiaries. *Journal of the American Medical Association, 309*(4), 381-391. doi:10.1001/jama.2012.216607

Centers for Medicare & Medicaid Services (2018). NHE fact sheet. Retrieved from https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nhe-fact-sheet.html

Chong, V. H., Singh, J., Parry, H., Saunders, J., Chowdhury, F., Mancini, D. M., & Lang, C. C. (2015). Management of noncardiac comorbidities in chronic heart failure. *Cardiovascular Therapeutics, 33*(5), 300-315. doi:10.1111/1755-5922.12141

Chrysant, S. G. (2016). Effects of high salt intake on blood pressure and cardiovascular disease: The role of COX inhibitors. *Clinical Cardiology, 39*(4), 240-242. doi:10.1002/clc.22536

Cogswell, M. E., Mugavero, K., Bowman, B. A., & Frieden, T. R. (2016). Dietary sodium and cardiovascular disease risk-measurement matters. *The New England Journal of Medicine, 375*(6), 580-586. doi:10.1056/NEJMsb1607161

Chung, M. L., Park, L., Frazier, S. K., & Lennie, T. A. (2017). Long-term adherence to low-sodium diet in patients with heart failure. *Western Journal of Nursing Research, 39*(4), 553-567. doi:10.1177/0193945916681003

Department of Health & Human Services (2014). Hospital Compare. Retrieved from www.hospitalcompare.hhs.gov/

Doris, S. F. (2016). Effective management for older people with heart failure: From acute to palliative care paradigms. *Journal of Geriatric Cardiology, 13*(5), 391-392. doi:10.11909/j.issn.1671-5411.2016.05.007

Elorriaga, N., Gutierrez, L., Romero, I. B., Moyano, D. L., Poggio, R., Calandrelli, M., ... Irazola, V. (2017). Collecting evidence to inform salt reduction policies in Argentina: Identifying sources of sodium intake in adults from a population-based sample. *Nutrients, 9*(9), 1-14. doi:10.3390/nu9090964

Eshkoor, S. A., Hamid, T. A., Shahar, S., Ng, C. K., & Mun, C. Y. (2016). Factors affecting hypertension among the Malaysian elderly. *Journal of Cardiovascular Development and Disease, 3*(1), 1-10. doi:10.3390/jcdd3010008

Farquhar, W. B., Edwards, D. G., Jurkovitz, C. T., & Weintraub, W. S. (2015). Dietary sodium and health: More than just blood pressure. *Journal of the American College of Cardiology*, 65(10), 1042-1050. doi:10.1016/j.jacc.2014.12.039

Grove, S., Burns, N., & Gray, J. (2017). *The practice of nursing research: Appraisal, synthesis, and generation of evidence* (8th Ed.). St. Louis, MO: Saunders Elsevier.

Heart Failure Society of America (2013). *Module 2: How to follow a low-sodium diet*. Retrieved from http://www.hfsa.org/wp-content/uploads/2014/06/module_2_following_a_low_sodium_diet.pdf

Heidenreich, P. A., Albert, N. M., Allen, L. A., Bluemke, D. A., Butler, J., Fonarow, G. C., ...Nichol, G. (2013). Forecasting the impact of heart failure in the United States: A policy statement from the American Heart Association. *Circulation: Heart Failure, 6*(3), 606-619. doi:10.1161/HHF.0b013e318291329a

Healthy People 2020 (2014). Older adults - Healthy people. Retrieved from http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topici=31

Higgs, S., & Thomas, J. (2016). Social influences on eating. *Current Opinion in Behavioral Sciences, 9*, 1-6. doi:10.1016/j.cobeha.2015.10.005

Huang, H. T., Kuo, Y. M., Wang, S. R., Wang, C. F., & Tsai, C. H. (2016). Structural factors affecting health examination behavioral intention. *International Journal of Environmental Research and Public Health, 13*(4), 395-410. doi:10.3390/ijerph13040395

Huntington, M. K., Guzman, A. I., Roemen, A., Fieldsend, J., & Saloum, H. (2013). Hospital-to-Home: A hospital readmission reduction program for congestive heart

failure. *South Dakota Medicine: The Journal of The South Dakota State Medical Association*, 66(9), 370-373. PMID: 24279113

Inamdar, A. A., & Inamdar, A. C. (2016). Heart failure: diagnosis, management, and utilization. *Journal of Clinical Medicine*, *5*(7), 1-28. doi:10.3390/jcm5070062

Jones, C. L., Jensen, J. D., Scherr, C. L., Brown, N. R., Christy, K., & Weaver, J. (2015). The health belief model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. *Health Communication*, *30*(6), 566-576. doi:10.1080/10410236.2013.873363

Kato, N. P., Kinugawa, K., Sano, M., Kogure, A., Sakuragi, F., Kobukata, K., ...Kazuma, K. (2016). How effective is an in-hospital heart failure self-care program in a Japanese setting? Lessons from a randomized controlled pilot study. *Patient Preference and Adherence*, *10*, 171-181. doi:10.2147/PPA.S100203

Kelly, D. L. (2017). Applying quality management in healthcare: A systems approach (4th Ed.). Chicago, IL: Health Administration Press.

Knudson, J., & G Cabrera, A. (2016). The pathophysiology of heart failure in children: the basics. *Current Cardiology Reviews*, *12*(2), 99-103. doi:10.2174/1573403X12666151119164525

Krim, S. R., Campbell, P., Lavie, C. J., & Ventura, H. (2013). Micronutrients in chronic heart failure. *Current Heart Failure Reports*, *10*(1), 46-53. doi:10.1007/s11897-012-0118-4

Liou, H. L., Chen, H. I., Hsu, S. C., Lee, S. C., Chang, C. J., & Wu, M. J. (2015). The effects of a self-care program on patients with heart failure. *Journal of the Chinese Medical Association, 78*(11), 648-656. doi:10.1016/j.jcma.2015.06.004

Mahramus, T., Penoyer, D. A., Frewin, S., Chamberlain, L., Wilson, D., & Sole, M. L. (2014). Assessment of an educational intervention on nurses' knowledge and retention of heart failure self-care principles and the teach back method. *Heart Lung, 43*(3), 204-212. doi:10.1016/j.hrtlng.2013.11.012

Maliakkal, A. V., & Sun, A. Z. (2014). Home care program reduces hospital readmissions in patients with congestive heart failure and improves other associated indicators of health. *Home Health Care Management & Practice, 26*(4), 191-197. doi:10.1177/1084822314527763

Masarone, D., Valente, F., Rubino, M., Vastarella, R., Gravino, R., Rea, A., ...Limongelli, G. (2017). Pediatric heart failure: A practical guide to diagnosis and management. *Pediatrics & Neonatology, 58*(4), 303-312. doi:10.1016/j.pedneo.2017.01.001

McEwen, M., & Wills, E.M. (2014). *Theoretical basis for nursing* (4th ed.). Philadelphia, PA: Lippincott Williams & Wilkins.

McHugh, M. D., Berez, J., & Small, D. S. (2013). Hospitals with higher nurse staffing had lower odds of readmissions penalties than hospitals with lower staffing. *Health Affairs, 32*(10), 1740-1747. doi:10.1377/hlthaff.2013.0613

McIlvennan, C. K., Eapen, Z. J., & Allen, L. A. (2015). Hospital readmissions reduction program. *Circulation,* 131(20), 1796–1803. http://doi.org/10.1161/CIRCULATIONAHA.114.010270

Mills, K. T., Chen, J., Yang, W., Appel, L. J., Kusek, J. W., Alper, A., ... Rahman, M. (2016). Sodium excretion and the risk of cardiovascular disease in patients with chronic kidney disease. *Journal of the American Medical Association, 315*(20), 2200-2210. doi:10.1001/jama.2016.4447

Mosalpuria, K., Agarwal, S. K., Yaemsiri, S., Pierre-Louis, B., Saba, S., Alvarez, R., & Russell, S. D. (2014). Outpatient management of heart failure in the United States, 2006-2008. *Texas Heart Institute Journal, 41*(3), 253-261. doi:10.14503/THIJ-12-2947

O'Connor, M., Murtaugh, C. M., Shah, S., Barrón-Vaya, Y., Bowles, K. H., Peng, T. R., ... Feldman, P. H. (2016). Patient characteristics predicting readmission among individuals hospitalized for heart failure. *Medical Care Research and Review, 73*(1), 3-40. doi:10.1177/1077558715595156

Peters, S. A., Dunford, E., Ware, L. J., Harris, T., Walker, A., Wicks, M., ... Webster, J. (2017). The sodium content of processed foods in South Africa during the introduction of mandatory sodium limits. *Nutrients, 9*(4), 404-419. doi:10.3390/nu9040404

Petiprin, A. (2015). Dorothea E. Orem: Self-care deficit theory. *Nursing-Theory.org*. Retrieved from http://www.nursing-theory.org/theories-and-models/orem-self-care-deficit-theory.php

Riley, J. P., Gabe, J.P., & Cowie, M.R. (2013). Does telemonitoring in heart failure empower patients for self-care? A qualitative study. *Journal of Clinical Nursing, 22*(18), 2444-2455. doi:10.1111/j.1365-2702.2012.04294.x

Rodrigues, F. M., Rosenthal, A., & Tiburski, J. H. (2016). Alternatives to reduce sodium in processed foods and the potential of high pressure technology. *Food Science and Technology (Campinas), 36*(1), 1-8. doi:10.1590/1678-457X.6833

Sow, M. T. (2014). Using ANOVA to examine the relationship between safety & security and human development. *Journal of International Business and Economics, 2*(4), 101-106. http://dx.doi.org/10.15640/jibe.v2n4a6

Stevenson, C. W., Pori, D., Payne, K., Black, M., & Taylor, V. E. (2015). Hearing the veteran's voice in congestive heart failure readmissions. Professional case management, 20(4), 177-185. doi:10.1097/NCM.0000000000000080

Teixeira, J. D. F., Goulart, M. R., Busnello, F. M., & Pellanda, L. C. (2016). Hypertensives' knowledge about high-sodium foods and their behavior. *Arquivos Brasileiros de Cardiologia, 106*(5), 404-410. doi:10.5935/abc.20160049

Terry, A. J. (2015). *Clinical research for the doctor of nursing practice*. (2nd Ed.). Burlington, MA: Jones & Bartlett Learning.

White, K. M., & Dudley-Brown, S., & Teerhar, M.F. (2016). *Translation of evidence into nursing and healthcare* (2nd Ed). New York, NY: Springer.

Wylie (2018). *Journal of Clinical Nursing.* Retrieved from https://www.wiley.com/en-us/Journal+of+Clinical+Nursing-p-9780JRNL62286

Wong, M. M., Arcand, J., Leung, A. A., Thout, S. R., Campbell, N. R., & Webster, J. (2017). The science of salt: A regularly updated systematic review of salt and health outcomes (December 2015–March 2016). *The Journal of Clinical Hypertension, 19*(3), 322-332. doi:10.1111/jch.12970

Appendix A: Low Sodium/Salt Diet Handout

Low Sodium/Salt diet handout: _____ mg per day

Why do I need sodium/salt?

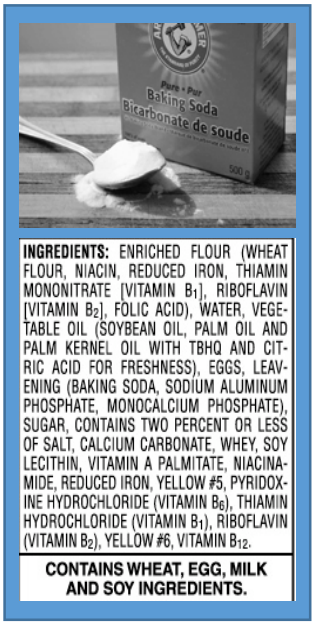
Sodium/salt is important in the body for water balance, blood pressure control, as well as nerve and muscle functions. The amount of sodium/salt in the body is partly balanced by the kidneys and their glands. Sodium/salt is found in most foods (naturally occurring or added to flavor/preserve), mouth care and other products, and even some drugs ([5]).

What is the problem?

The average American eats/drinks at least twice as much sodium/salt as advised, 3,300 milligrams (mg) daily ([2]; [5]; [7]). It can be very hard to follow a low sodium/salt diet because there are so many hidden sources of sodium/salt, even in many things that do not taste salty ([6]; [10]). The purpose of this handout is to help you be successful. Many believe they are following a low sodium/salt diet because they do not add salt to foods; however, less than 25% of the sodium/salt in the American diet comes from a salt shaker ([8]). Many would be surprised to learn that more than 75% of sodium/salt in the American diet comes from processed, prepackaged, and restaurant foods ([5]; [7]). High sodium/salt intake is linked to some serious health problems, such as High blood pressure, heart failure, stroke, kidney disease, and even weak bones ([2]; [5]; [7]).

So, how much sodium/salt do I need?

The American College of Cardiology/American Heart Association Task Force says healthy adults should eat no more than 2300 mg of sodium/salt each day; which is about one teaspoon ([3]). Less sodium/salt is suggested for people with some health problems; for example, people with high blood pressure should limit their use to 1500 mg (about ¾ teaspoon), and people with congestive heart failure, kidney disease, liver disease should have much less as directed by their doctor ([3]; [5]; [7]). To maintain health, as little as 500 mg (about ¼ teaspoon) is all that is needed ([3]; [5]; [7]).

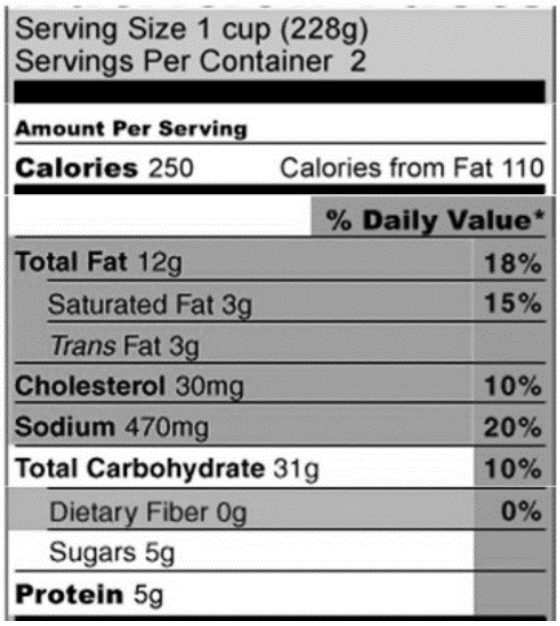


How do I find out how much sodium/salt I am eating/drinking?

Nutrition facts labels show sodium/salt content per serving. People should understand many foods have more than one serving in the package; this is also found on the nutrition fact label. Other foods do not have nutrition facts labels, you can check the ingredient lists for sources of sodium/salt, like Monosodium/salt glutamate (MSG), baking soda, baking powder, disodium/salt phosphate, sodium/salt alginate, sodium/salt nitrate, and nitrite. Nutrition facts can also be found in recipe and nutrition books; online sources like government, health, nutrition websites, product websites; as well as in many apps that let you look up nutrition facts and even track daily intake ([2]).

How do I use a nutrition fact label to see how much sodium/salt is in food?

First, check the serving size so to see how much food is in one serving. In this example, a serving is 1 cup; note that the package contains two servings. So, if more than one cup is eaten/drank, the number of mg listed would be multiplied by the number of servings used. Second, find the sodium/salt content in each serving, it is usually listed in milligrams. In this example, there is 470 mg of sodium/salt in one cup. If a person ate/drank both cups, multiply 470 mg per serving by two servings to equal a total of 940 mg.



Serving Size 1 cup (228g)	
Servings Per Container 2	
Amount Per Serving	
Calories 250	Calories from Fat 110
	% Daily Value*
Total Fat 12g	18%
Saturated Fat 3g	15%
Trans Fat 3g	
Cholesterol 30mg	10%
Sodium 470mg	20%
Total Carbohydrate 31g	10%
Dietary Fiber 0g	0%
Sugars 5g	
Protein 5g	

What do those sodium/salt labels mean?

Food with less than 5 mg of sodium/salt per serving can be labeled sodium/salt-free. Food with 35 mg or less per serving can be labeled very low sodium/salt, and food with less than 140 mg per serving can be labeled low sodium/salt. Some other labels are a bit trickier. For example, food can be labeled reduced sodium/salt if it has at least 25 % less sodium/salt per serving or as light if it has at least 50% less sodium/salt per serving; both of these compare the food to the usual sodium/salt level of the same food. However, most reduced and light sodium/salt foods still have more than 140 mg of sodium/salt, so they are not low sodium/salt ([2]).

High sodium/salt foods: Worst offenders?

The highest sodium/salt content foods include Processed foods, salty snacks, canned and packaged foods, frozen meals, frozen vegetables with sauces, condiments, dressings, sauces, meats soaked in or injected with sodium/salt water, lunch meats and cheeses, fast foods, and restaurant foods. **Challenge: Create your own low sodium/salt versions!**

Low sodium/salt foods: Healthier options?

Following is a list of lower sodium/salt content foods: Fresh or fresh frozen foods (without sauces) like fruits, vegetables, grains, pasta, meats; low sodium/salt foods like dairy, condiments, breads, pickles, olives, etc.; and no added salt products such as canned vegetables. These tools will help you find foods and follow a low sodium/salt diet.

Tips for success!

Cook from fresh so that you can better control the sodium/salt! If possible; reduce sodium/salt intake slowly in order to allow your taste time to change. Be willing to experiment with ingredients to replace salt: Nutritional yeast (inactivated, not alive); lemon and lime juices, vinegars; herbs, spices, garlic, onions, etc. Try to find or make low sodium/salt versions of high sodium/salt foods like pickles, chips, pizza, and jerky ([2]; [5]; [7]; [8]; [9]).

How do I modify a recipe?

Find a recipe you like; do not forget to check out recipes in low sodium/salt cookbooks. Identify all sources of sodium/salt in the recipe and replace them with no or low sodium/salt options. You may have to make your own low sodium/salt replacements for common high sodium recipe ingredients like condiments (homemade mustard, mayo, ketchup, barbecue sauce), soups (cream of chicken/mushroom, stocks), or other prepared items (bread crumbs, prepared sauce/gravy, etc.) if they are not available where you live. Think about the textures and flavors of ingredients when choosing replacement ingredients. You could add extra of the spices/herbs already used in the recipe or even try to add different ones to get a pleasant taste. Search recipes for herb or spice combinations ideas. Some recipes can benefit from adding a splash of vinegar or lemon juice; other recipes might need a bit of sugar or honey to balance the flavors. Be willing to taste your food many times during seasoning process; remember, you can always add more, but you cannot take it back ([4]; [9]). Last, add up all the sodium/salt in your revised recipe and divide by the number of servings in the dish.

Check your understanding:

1. Which of the following single servings of foods is likely to be the lowest in sodium/salt content? _____
    a. Vegetable beef and barley soup
    b. Chef salad with chicken, eggs, cheddar cheese, cucumbers, and bottled ranch dressing
    c. Bacon, lettuce, and tomato sandwich with mayonnaise
    d. Pasta with tomato paste, garlic, onion, bell peppers, basil, oregano, and parsley

How do I track my sodium/salt intake?

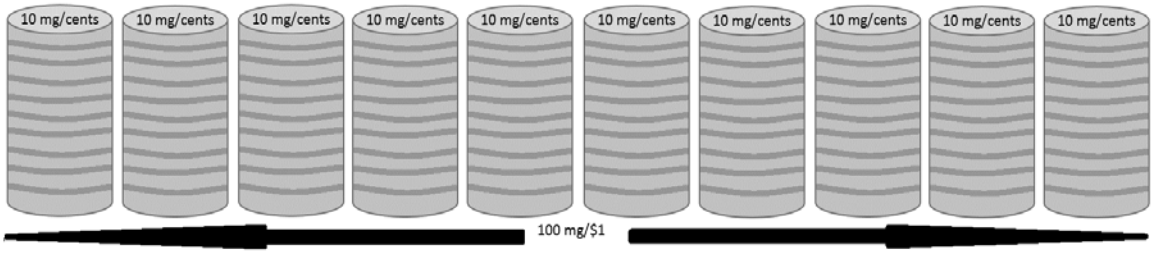
You can track sodium/salt in many ways; remember you have options, not rules. Either way, you choose!

- Keep a running total of the sodium/salt you eat/drink in a food diary or app.
- Evenly divide your sodium/salt allowance between each meal/snack.
    - For example, if you had a 1,500 mg sodium/salt allowance, you could:
        - 500 mg for breakfast
        - 500 mg for lunch
        - 500 mg for dinner
            - or
        - 400 mg for breakfast
        - 100 mg morning snack
        - 400 mg for lunch
        - 100 mg afternoon snack
        - 400 mg dinner
        - 100 mg bedtime snack

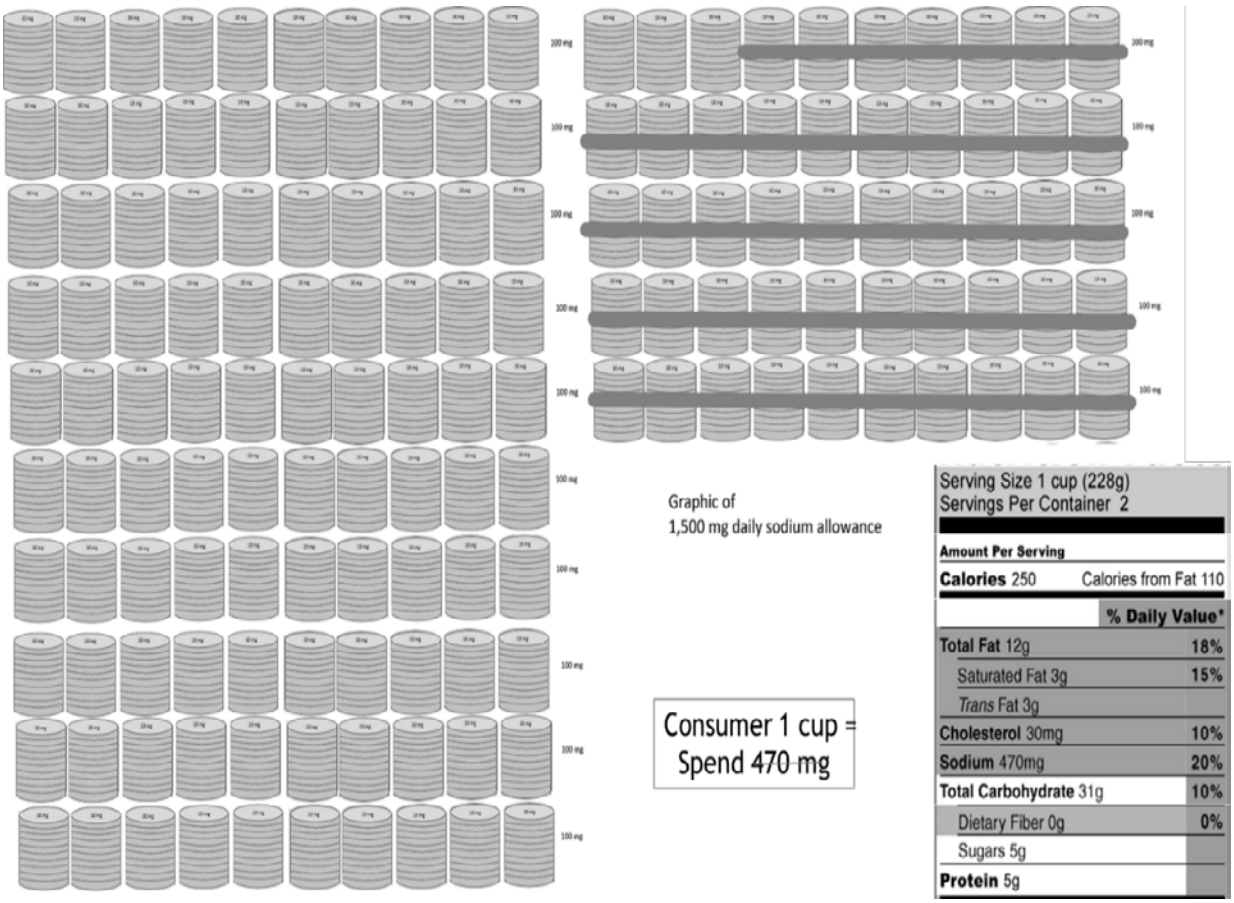
Meal	Food	Sodium
Breakfast		
Snack		
Lunch		
Snack		
Dinner		
Snack		
Total		

- Some find it helpful to think about their daily limit just like money/allowance.
- Do not borrow/save one day's budget for another day.

10 pennies = 1 dime; 10 dimes = 1 dollar, & 100 pennies = 1 dollar.



- 1 gram (gm) = 1000 mg (So, 1.5 grams = 1,500 mgs and 2 grams = 2,000 mg).
  - Since both are based upon 10s, you can just think of each 1 mg = 1 penny.
  - 1.5 grams daily = 1,500 pennies (or mg) each day = $15.00.
  - 2 grams daily = 2,000 pennies (or mg) each day = $20.00.
- See the example below, a 1,500 mg limit with eating/drinking 1 cup (crossed off) with 470 mg of sodium/salt.



Let's practice: Find and total the lower and higher salt/sodium options for these breakfast and lunch examples.

Breakfast

- One cup oatmeal
- One cup milk
- One medium banana
- One slice toast
- One tablespoon peanut butter

Oatmeal.

	Quaker Quick Oats	Quaker Instant Oatmeal - Original
Serving Size:	1 oz (30 g)	1 packet (28 g)
Calories:	113 kcal	100 kcal
Fat:	2.3 g	2 g
Saturated Fat:	0.4 g	0 g
Protein:	3.8 g	4 g
Total Carbohydrates:	20.3 g	19 g
Fiber:	3 g	3 g
Sodium:	0 mg	75 mg

SALTED NET WT. 16 oz.

Nutrition Facts
Serving size 1 Tbsp. (14g)
Servings per Container: 32

Amount Per Serving	
Calories 100	Calories from Fat 100
	% Daily Value
Total Fat 11g	17%
Saturated Fat 7g	36%
Trans Fat 0g	0%
Cholesterol 30mg	10%
Sodium 120mg	5%
Total Carbohydrate 0g	0%
Protein 0g	

Vitamin A 8%

Not a significant source of dietary fiber, sugar, vitamin C, calcium and iron.

*Percent Daily Values are based on a 2,000 calorie diet.

INGREDIENTS: GRADE A CREAM, SEA SALT.

UNSALTED NET WT. 16 oz.

Nutrition Facts
Serving size 1 Tbsp. (14g)
Servings per Container: 32

Amount Per Serving	
Calories 100	Calories from Fat 100
	%Daily Value*
Total Fat 11g	17%
Saturated Fat 7g	36%
Trans Fat 0g	0%
Cholesterol 30mg	10%
Sodium 0mg	0%
Total Carbohydrate 0g	
Protein 0g	0%

Vitamin A 8%

Not a significant source of dietary fiber, sugar, vitamin C, calcium and iron.

*Percent Daily Values are based on a 2,000 calorie diet.

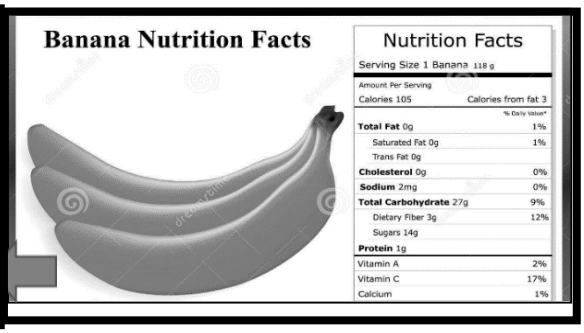
INGREDIENTS: GRADE A CREAM, NATURAL FLAVOR.

Butter?

➢

What about a serving of milk?

	Original Almond Breeze	Regular Soy Milk *	Reduced fat (1%) Soy Milk*	Low Fat (0.5%) Soy Milk*	Regular Rice Milk *	Skim Cow's milk*	Reduced Fat Cow's milk*	Regular Cow's Milk*
Fibre (g)	0.5	1.5	1.5	1.75	0	0	0	0
Sodium (mg)	130	112	117.5	132.5	162	127	155	92.5
Calcium (mg)	188	297	297.5	352.5	182	302	522	267



Choose one tbsp. of peanut butter.

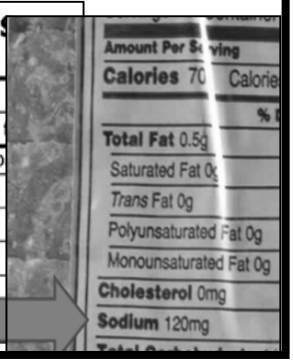
Details	All Natural Super Chunky UNSALTED	All Natural Smooth UNSALTED	Organic All Natural Chunky	Organic All Natural Creamy
INGREDIENTS	Roasted Peanuts	Roasted Peanuts	Organic Dry Roasted Peanuts, Sea Salt	Organic Dry Roasted Peanuts, Sea Salt
Calories	190	190	190	190
Fat Calories	140	140	140	140
Total Fat	16g	16g	16g	16g
Sat. Fat	2g	2g	2g	2g
Trans Fat	0g	0g	0g	0g
Polyunsat. Fat	5g	5g	5g	5g
Monounsat. Fat	8g	8g	8g	8g
Cholesterol	0mg	0mg	0mg	0mg
Sodium	0mg	0mg	100mg	125mg
Total Carb	7g	7g	7g	7g

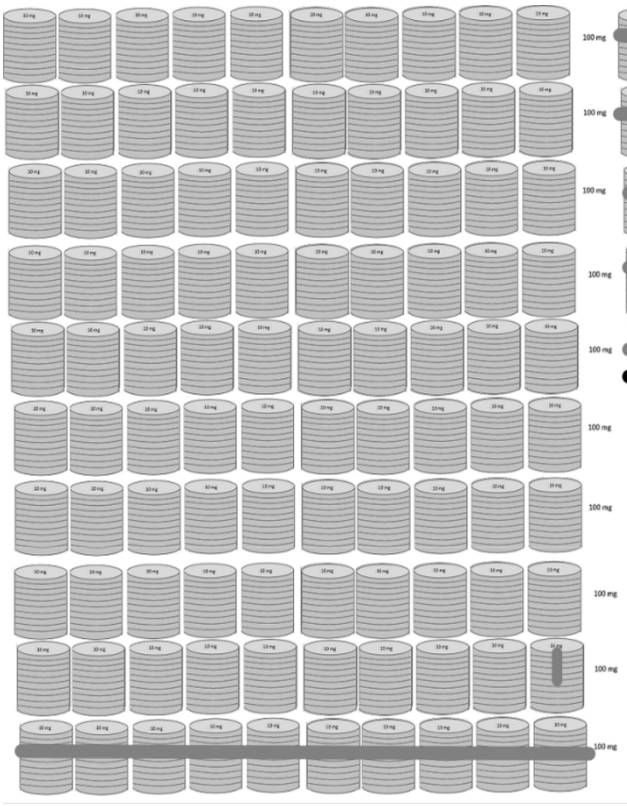
One slice of whole wheat bread.

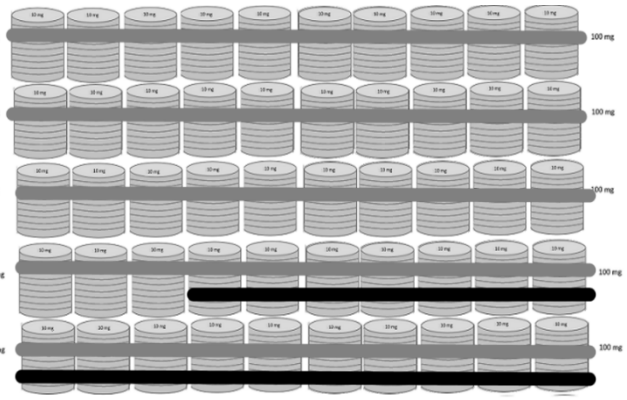
Brand A

Nutrition Facts
Serving Size: 1 slice
Amount Per Serving
Calories 80 Calories
% D
Total Fat 0.5 g
Saturated Fat 0 g
Trans Fat 0 g
Cholesterol 0 mg
Sodium 75 mg

Brand B







How much sodium do you choose to "spend"?

Food	Lower option	Higher option
Oatmeal	0	75
Butter	0	120
Bread	75	120
Peanut butter	0	125
Banana	2	2
Milk	93	163
Totals	**170**	605

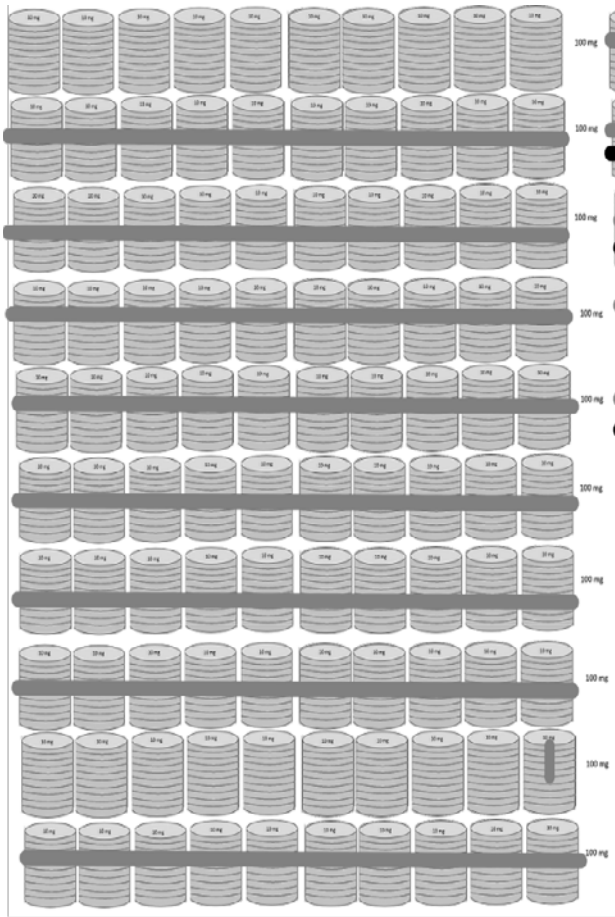
Check your understanding:

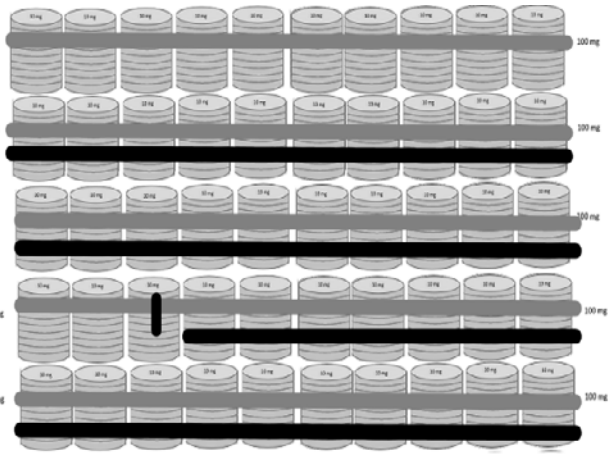
2. Which peanut butter has the most sodium/salt per serving: _____
    a. Organic all natural chunky
    b. All natural smooth unsalted
    c. Organic all natural creamy
    d. All natural super chunky unsalted

Next meal?

- Lunch
  - 3 ½ ounces grilled skinless, boneless chicken breast
    - Cooked from raw product without adding salt 65 mg
    - Tyson grilled chicken breast fillets 370 mg
  - 1 cup salad greens
    - Field green mix 20 mg
    - Romaine lettuce 0 mg
  - Olive oil and vinegar dressing (for salad)
    - Prepared from scratch without added salt 0 mg
    - Newman's Own bottled dressing 150 mg
  - 5 unsalted or low-sodium crackers
    - Low sodium 160 mg
    - Unsalted tops 150 mg
  - Fruit plate with
    - ¼ cup strawberries = 0 mg
    - ½ sliced orange = 0 mg
    - ½ peach = 0 mg

Food	Lower option	Higher option
Chicken	65	370
Greens	0	20
Dressing	0	150
Crackers	150	160
Fruit	0	0
Total	215	700





How much sodium do you choose to "spend"?

Food	Lower option	Higher option
Chicken	65	370
Greens	0	20
Dressing	0	150
Crackers	150	160
Fruit	0	0
Total	215	700
Running total	**385**	1305

Check your understanding:

1. If you chose both lower sodium/salt options, after lunch how many mgs do you have left of your 1,500 mg ($15.00) for the rest of the day? _____ mg

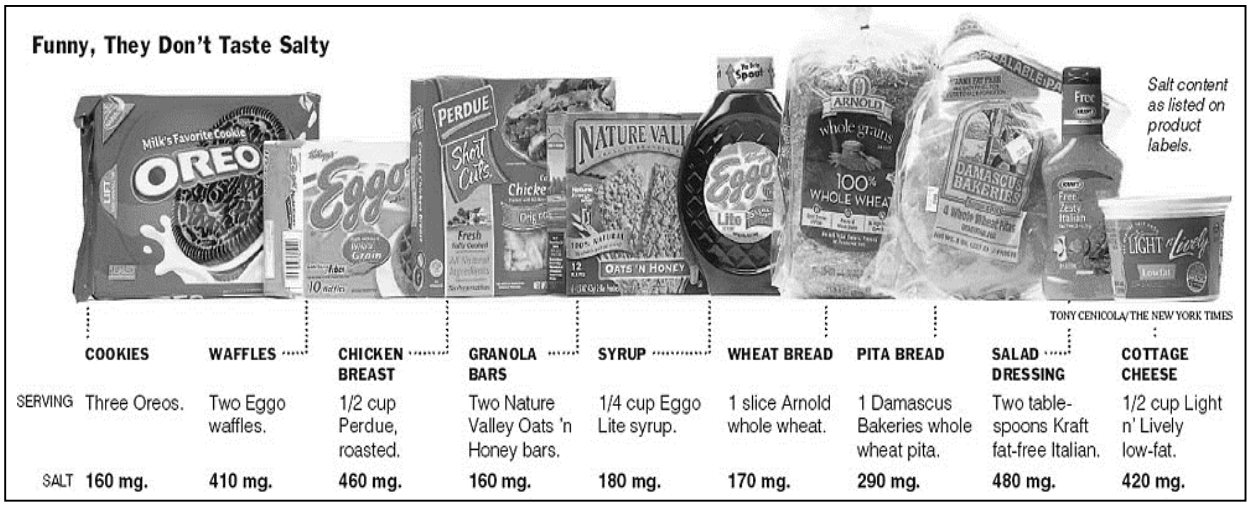
2. If you chose both high sodium/salt options, after lunch how many mgs do you have left of your 1,500 mg ($15.00) for the rest of the day? _____ mg

How will you choose to spend your daily sodium/salt allowance?

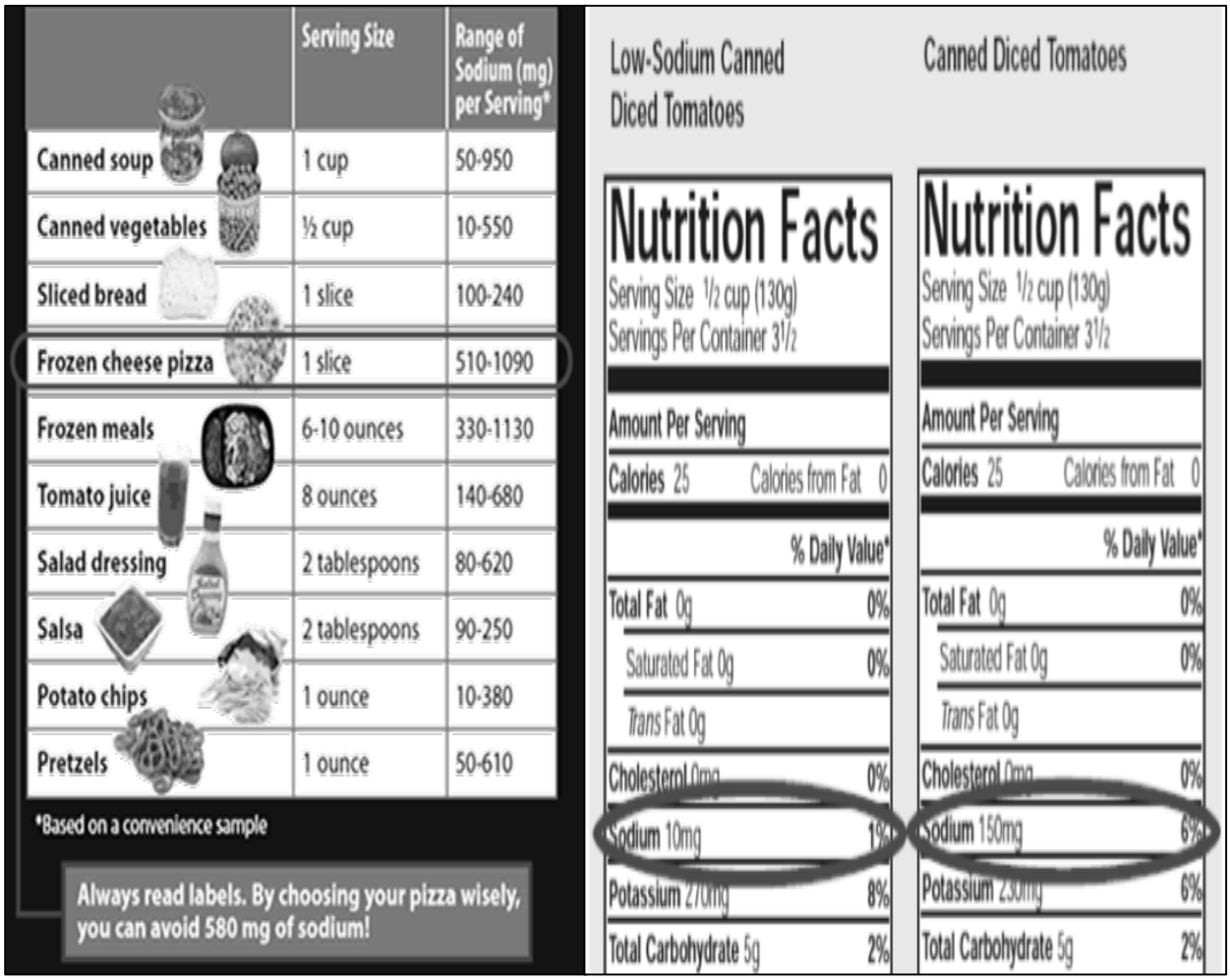
- Budget Wisely
  - Eliminate frivolous or wasteful spending
    - Sodium sources you do not truly enjoy
      - Overly salted foods
      - Hidden sodium that does not add flavor
    - Processed foods
    - Frozen foods
  - Treat yourself occasionally
    - Eat a half or quarter of a normal portion
    - Eat lower salt for the rest of the day to stay on budget
  - Small savings add up
    - Choose items with lower sodium content
    - Remove the salt shaker from the table

([1]; [2]; [3]; [4], [5]; & [7]).

Read those nutrition facts:



	COOKIES	WAFFLES	CHICKEN BREAST	GRANOLA BARS	SYRUP	WHEAT BREAD	PITA BREAD	SALAD DRESSING	COTTAGE CHEESE
SERVING	Three Oreos.	Two Eggo waffles.	1/2 cup Perdue, roasted.	Two Nature Valley Oats 'n Honey bars.	1/4 cup Eggo Lite syrup.	1 slice Arnold whole wheat.	1 Damascus Bakeries whole wheat pita.	Two table-spoons Kraft fat-free Italian.	1/2 cup Light n' Lively low-fat.
SALT	160 mg.	410 mg.	460 mg.	160 mg.	180 mg.	170 mg.	290 mg.	480 mg.	420 mg.



	Serving Size	Range of Sodium (mg) per Serving*
Canned soup	1 cup	50-950
Canned vegetables	½ cup	10-550
Sliced bread	1 slice	100-240
Frozen cheese pizza	1 slice	510-1090
Frozen meals	6-10 ounces	330-1130
Tomato juice	8 ounces	140-680
Salad dressing	2 tablespoons	80-620
Salsa	2 tablespoons	90-250
Potato chips	1 ounce	10-380
Pretzels	1 ounce	50-610

*Based on a convenience sample

Always read labels. By choosing your pizza wisely, you can avoid 580 mg of sodium!

Be encouraged!

- Give yourself time for taste to adjust
- Soon you will discover more flavors
  - Delicate flavors masked by salt
  - New seasoning you tried
  - New recipes you create and share
- You are not alone
  - Low sodium recipes
    - Books
    - Online
  - Check out websites
    - Government nutrition and health sites
    - Health agency sites
    - Disease specific support group sites
    - Social media sites
- Be persistent
  - Your health may thank you!

Suggested salt-free flavor pairings

- Beef
  - Basil, bay leaf, caraway, curry, dill, dry mustard, garlic, grape jelly, green pepper, mace, marjoram, mushrooms, nutmeg, onion, parsley, pepper, rosemary, sage
- Chicken
  - Basil, cloves, cranberries, mace, mushrooms, nutmeg, oregano, paprika, parsley, pineapple, saffron, sage, savory, tarragon, thyme, tomato, turmeric
- Desserts
  - Allspice, anise, cinnamon, cloves, ginger, mace, nutmeg, vanilla, other extracts
- Egg
  - Chervil, curry, dill, dry mustard, garlic, green pepper, jelly, mushrooms, nutmeg, onion, paprika, parsley, rosemary, tarragon, tomato
- Fish
  - Basil, bay leaf, chervil, curry, dill, dry mustard, green pepper, lemon, marjoram, mushrooms, paprika, pepper, tarragon, tomato, turmeric
- Lamb
  - Cloves, curry, dill, garlic, mace, mint, mint jelly, onion, oregano, parsley, pineapple, rosemary, tarragon, thyme
- Pork
  - Applesauce, basil, caraway, chives, garlic, onion, rosemary, thyme
- Veal
  - Apricots, basil, bay leaf, currant jelly, curry, ginger, marjoram, mushrooms, oregano, paprika
- Vegetables
  - Basil, dill, garlic, ginger, lemon, mace, marjoram, nutmeg, onion, tarragon, tomato, sugar, vinegar

([4] & [9])

References

[1]Academy of Nutrition and Dietetics (AND, n.d.). Heart failure nutrition therapy (Patient handout). eat right. academy of nutrition and dietetics.

[2]American Heart Association, (AHA, 2016). How much sodium/salt should I eat per day? American Heart Association/American Stroke Association. Retrieved from www.sodium/saltbreakup.heart.org/sodium/salt-411/how-much-sodium/salt-do-you-need

[3]Eckel et al (2014). 2013 AHA/ACC Guideline on lifestyle management to reduce cardiovascular risk: A report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. Journal of American Colleges of Cardiology. 2014:63(25_PA). doi: 10.1016/j.jacc.2013.11.003

[4]Goldman-Foung, J. (2013). *Sodium/salt girl's limitless low-sodium/salt cookbook*. Hoboken, NJ: John Wiley & Sons, Inc.

[5]Kaplan, N. and Olendzki, B. (2015). Patient information: Low-sodium/salt diet (Beyond the basics). UpToDate. Retrieved from www.uptodate.com/contents/low-sodium/salt-diet-beyond-the-basics

[6]Larsen. L. (2015). *The big book of low-sodium/salt recipes*. Avon, MA: F+W Media Inc.

[7]National Heart, Lung, and Blood Institute (NHLBI, 2015). Description of the DASH eating plan. Retrieved from http://www/nhlbi.nih.gov/health/health-topics/dash

[8]Sarmugam, R. and Worsley, A. (2014). Current levels of salt knowledge: A review of the literature. *Nutrients,* 6, 5534-5559, doi :10.3390/nu6125534[9]Webb, R. (2012). *You won't believe it's salt-free!* Boston, MA: Da Capo Press.

Check your understanding: Answers

1. D
2. C
3. 1,115 mg ($11.15)
4. 195 mg ($1.95)

Appendix B: Nursing Educating: LSD Teaching Process

Educating our Patients to Adopt a Low Sodium Diet

Overcoming the Challenge: First Steps

Karen Wright
Walden University
Doctorate of Nursing Practice Program
September 2018

Patient teaching; why bother?

- Orem's Self-Care Theory
  - People are capable
    - Self-reliant
    - Responsibility for their own care
    - Care for needs of family
  - Goal
    - Render patient/carers capable of meeting self-care needs
  - Benefits
    - Improve patient satisfaction and health outcomes
    - Improve nursing satisfaction
  - Tips for success
    - Determine goals
    - Know your learner
      - Assess current knowledge, culture, and goals
    - Make sure content is current and relevant
    - Avoid medical jargon
    - Use teach back or understanding checks to assess teaching effectiveness

(Jacksonville University, 2016)

- Both a mineral and an electrolyte
- Essential for
  - Fluid management
  - Blood pressure
  - Nerve function
  - Muscle function
- Partially balanced by the adrenal glands and kidneys
- Found in
  - Most foods (naturally occurring or as a seasoning/preservative)
  - Other products
    - Some medications
    - Oral care products

Kaplan & Olendzki, 2015

What is the problem?

- Most Americans
  - Consume at least twice as much sodium as recommended
    - Average of 3,300 mg daily
      - Has been considered an addiction
- Many hidden sources of sodium
  - Products that do not even taste salty
  - < 25% of American diet sodium comes from salt shaker
  - > 75% from processed, prepackaged, and restaurant foods
- High sodium intake is clearly linked to serious health problems
  - High blood pressure
  - Heart failure
  - Stroke
  - Kidney disease
  - Osteoporosis

AHA, 2016; Kaplan & Olendzki, 2015; Larsen, 2015; NHLBI, 2015; Sarmugam & Worsley, 2014; Webb, 2012.

How much do we need each day?

- Healthy adults
  - 2300 mg
    - Approximately 1 teaspoon
- Persons with high blood pressure
  - 1500 mg
    - Approximately ¾ teaspoon
- Persons with congestive heart failure, kidney disease, cirrhosis
  - Probably much less
    - By physician recommendation
  - Minimum daily requirement 500 mg
    - Approximately ¼ teaspoon

Eckel etal, 2014; Kaplan & Olendzki, 2015; NHLBI, 2015.

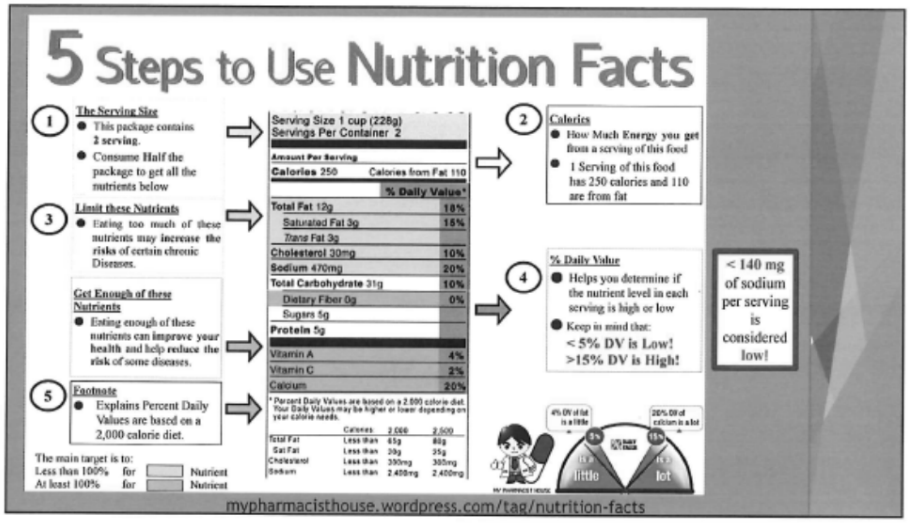
How much sodium I am consuming?

- Read the nutrition facts label
- Read ingredient lists for other sources of sodium
  - Monosodium glutamate (MSG)
  - Baking soda
  - Baking powder
  - Disodium phosphate
  - Sodium alginate
  - Sodium nitrate
  - Nitrite
- Read nutrition facts for foods without labels
  - Websites
  - Books
  - Apps
- Read recipe nutrition facts

AHA, 2016

INGREDIENTS: ENRICHED FLOUR (WHEAT FLOUR, NIACIN, REDUCED IRON, THIAMIN MONONITRATE [VITAMIN B_1], RIBOFLAVIN [VITAMIN B_2], FOLIC ACID), WATER, VEGETABLE OIL (SOYBEAN OIL, PALM OIL AND PALM KERNEL OIL WITH TBHQ AND CITRIC ACID FOR FRESHNESS), EGGS, LEAVENING [BAKING SODA, SODIUM ALUMINUM PHOSPHATE, MONOCALCIUM PHOSPHATE], SUGAR, CONTAINS TWO PERCENT OR LESS OF SALT, CALCIUM CARBONATE, WHEY, SOY LECITHIN, VITAMIN A PALMITATE, NIACINAMIDE, REDUCED IRON, YELLOW #5, PYRIDOXINE HYDROCHLORIDE (VITAMIN B_6), THIAMIN HYDROCHLORIDE (VITAMIN B_1), RIBOFLAVIN (VITAMIN B_2), YELLOW #6, VITAMIN B_{12}.

CONTAINS WHEAT, EGG, MILK AND SOY INGREDIENTS.



What do those sodium labels mean?

- Sodium-free
  - Less than 5 milligrams of sodium per serving
  - Contains no sodium chloride
- Very low sodium
  - 35 milligrams or less per serving
- Low sodium
  - 140 milligrams or less per serving
- Reduced (or less) sodium
  - Minimum 25 % less sodium per serving than the usual sodium level
- Light in sodium
  - Minimum 50% less sodium per serving than the usual sodium level

AHA, 2016.

High Sodium Foods: Worst offenders?

- Processed foods
  - Salty snack foods
  - Canned foods
  - Packaged foods
  - Frozen entrees/meals
  - Frozen foods with sauces added
  - Condiments
  - Brined or sodium solution injected meats
  - Luncheon meats and cheeses
- Fast foods
- Restaurant foods

Challenge: Create your own low sodium versions!

AHA, 2016; Kaplan & Olendzki, 2015; Larsen, 2015; NHLBI, 2015; Sarmugam & Worsley, 2014; Webb, 2012.

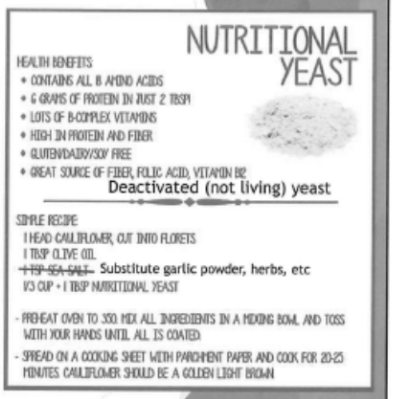
Healthier options?

- Fresh or fresh frozen (without sauces) foods
  - Fruits
  - Vegetables
  - Grains
  - Pasta
  - Meats
- Low sodium products
  - Dairy
  - Condiments
  - Breads
  - Pickles, olives, etc.
- No added salt products
  - Canned vegetables

AHA, 2016; Kaplan & Olendzki, 2015; NHLBI, 2015; Sarmugam & Worsley, 2014; Webb, 2012.

Tips for success?

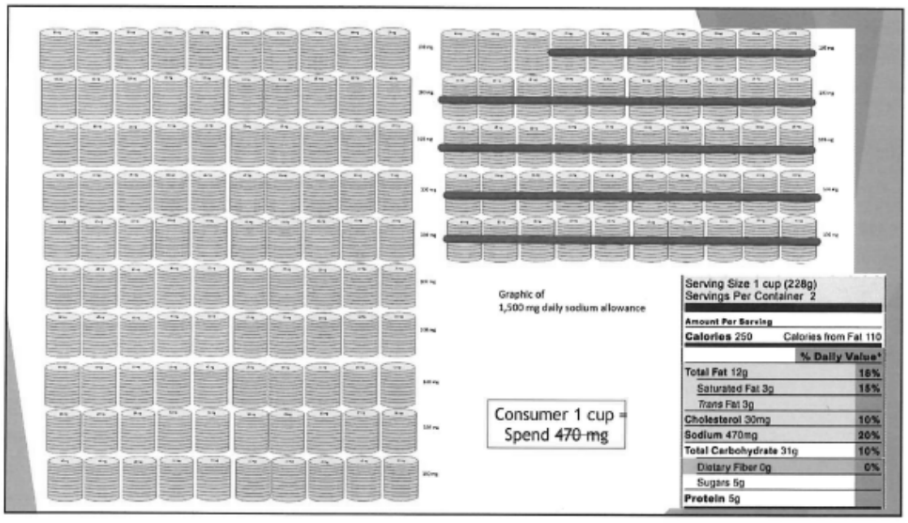
- Cook from fresh
  - You can better control the sodium!
- If possible; reduce sodium intake gradually.
  - Give your taste time to adjust.
- Ingredients to help fill the salt void:
  - Nutritional yeast
  - Lemon, lime, juices and vinegars
  - Herbs, spices, etc.
  - Garlic, onions, etc.
- Be willing to experiment!
  - Modify favorite recipes
  - Create low sodium versions of traditionally high sodium foods
    - Pickles
    - Chips
    - Pizza
    - Jerky



AHA, 2016; Kaplan & Olendzki, 2015; NHLBI, 2015; Sarmugam & Worsley, 2014; Webb, 2012.

How do I track my sodium intake?

- You can track sodium in many ways
  - Treat it just like money
    - Pennies quickly add up to dollars
    - Do not borrow from another day
    - Use it or loose it; start over each morning
  - Write it down
    - Sodium log
    - Sodium tracking app
- Think of your recommended daily value as a daily allowance
  - Some math facts: Just as
    - 10 pennies = 1 dime
    - 10 dimes = 1 dollar
    - 100 pennies = 1 dollar
    - 1 gram (gm) = 1000 milligrams (mg) (So, 2 grams = 2000 milligrams)
  - So, if your daily allowance is 1,500 mg = 1.5 (1 ½) grams
    - Think of 1 mg as = 1 penny
    - You could have 1,500 pennies (mg) each day!
    - Think of 1,500 mg as = $15.00 (2 grams would be $20.00)



Options not Rules

- Breakfast
  - Morning snack
- Lunch
  - Afternoon snack
- Dinner
  - Evening snack

- Running log/count of sodium consumed
  - Food diary
  - Electronic app
- Divide sodium budget between meal/snack
  - 1500 mg daily =
    - 500 mg for breakfast, lunch, dinner
  - 1500 mg daily =
    - 400 mg for breakfast, lunch, dinner
    - 100 mg for each snack

Meal	Food	Sodium
Breakfast		
Snack		
Lunch		
Snack		
Dinner		
Snack		
Total		

AHA, 2016; Eckel etal, 2014; Kaplan & Olendzki, 2015; NHLBI, 2015.

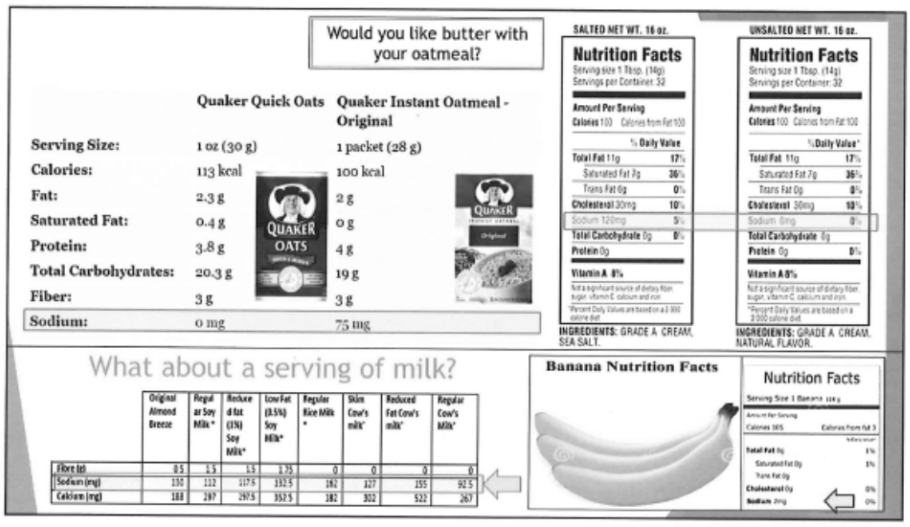
Recommended servings daily

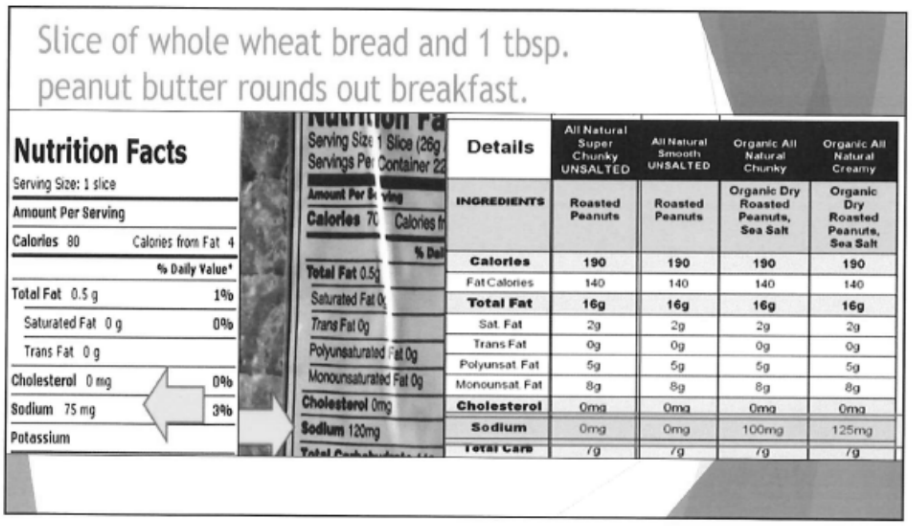
- Dairy
  - 2 Servings
    - About 150 mg each
      - 300 mg total
- Protein
  - 3 servings
    - About 60 mg each
      - 180 mg total
- Fruits and Vegetables
  - 5 or more servings
    - About 10 mg each
      - 50 mg total
- Grains
  - 5 servings
    - About 150 mg each
      - 750 mg total
- Fats and oils
  - Small amounts
- Total sodium about 1280 mg
  - Leaving about 220 mg
    - Adjustments
    - Overage
    - Snacks

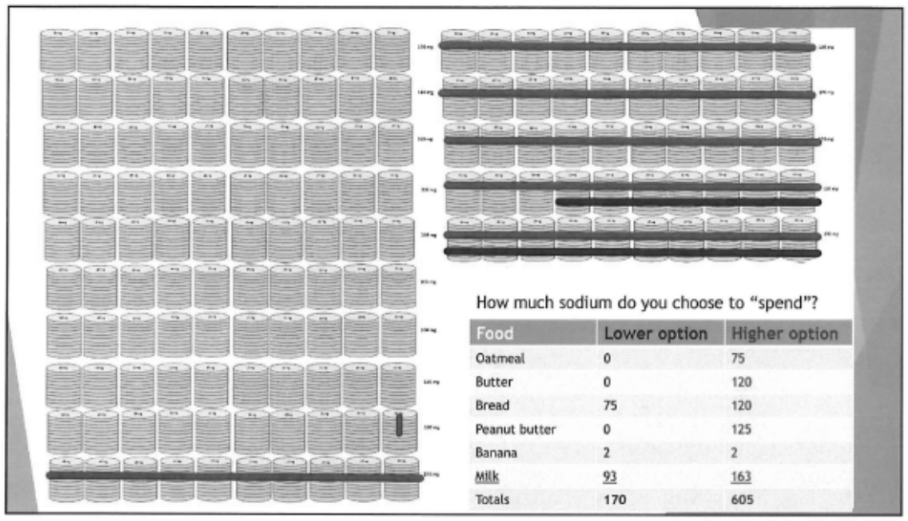
AND, n.d.; AHA, 2016; Eckel etal, 2014; Kaplan & Olendzki, 2015; NHLBI, 2015.

Lets Practice

- Breakfast
  - 1 cup oatmeal
  - 1 cup milk
  - 1 medium banana
  - 1 slice toast
  - 1 tablespoon peanut butter


Would you like butter with your oatmeal?
Quaker Quick Oats
Quaker Instant Oatmeal - Original
Serving Size: 1 oz (30 g) 1 packet (28 g)
Calories: 113 kcal 100 kcal
Fat: 2.3 g 2 g
Saturated Fat: 0.4 g 0 g
Protein: 3.8 g 4 g
Total Carbohydrates: 20.3 g 19 g
Fiber: 3 g 3 g
Sodium: 0 mg 75 mg
SALTED NET WT. 16 oz.
Nutrition Facts
UNSALTED NET WT. 16 oz.
Nutrition Facts
INGREDIENTS: GRADE A CREAM, SEA SALT.
INGREDIENTS: GRADE A CREAM. NATURAL FLAVOR.
What about a serving of milk?
Banana Nutrition Facts
Nutrition Facts


Slice of whole wheat bread and 1 tbsp. peanut butter rounds out breakfast.
Nutrition Facts
Serving Size: 1 slice
Amount Per Serving
Calories 80 Calories from Fat 4
% Daily Value*
Total Fat 0.5 g 1%
Saturated Fat 0 g 0%
Trans Fat 0 g
Cholesterol 0 mg 0%
Sodium 75 mg 3%
Potassium
Details
All Natural Super Chunky UNSALTED
All Natural Smooth UNSALTED
Organic All Natural Chunky
Organic All Natural Creamy
INGREDIENTS
Roasted Peanuts
Roasted Peanuts
Organic Dry Roasted Peanuts, Sea Salt
Organic Dry Roasted Peanuts, Sea Salt
Calories 190 190 190 190
Fat Calories 140 140 140 140
Total Fat 16g 16g 16g 16g
Sat. Fat 2g 2g 2g 2g
Trans Fat 0g 0g 0g 0g
Polyunsat. Fat 5g 5g 5g 5g
Monounsat. Fat 8g 8g 8g 8g
Cholesterol 0mg 0mg 0mg 0mg
Sodium 0mg 0mg 100mg 125mg



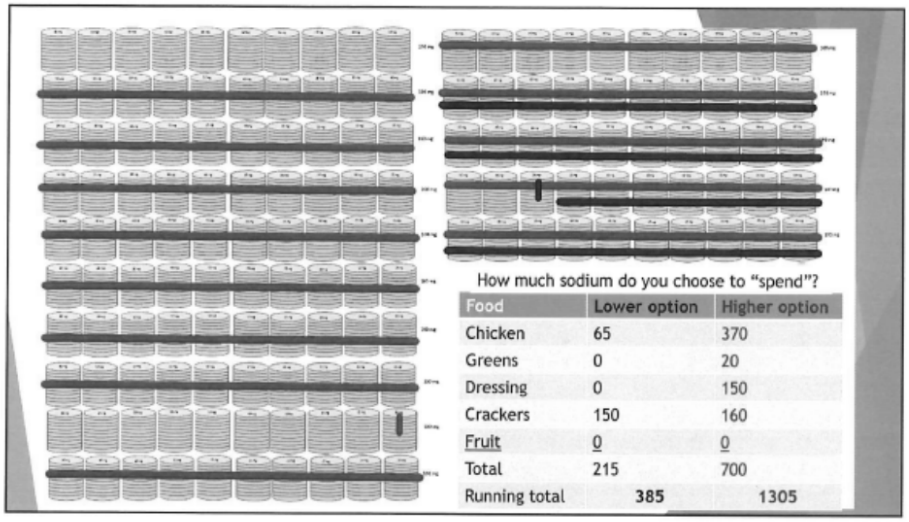
How much sodium do you choose to "spend"?

Food	Lower option	Higher option
Oatmeal	0	75
Butter	0	120
Bread	75	120
Peanut butter	0	125
Banana	2	2
Milk	93	163
Totals	170	605

Next meal?

- Lunch
  - 3 ½ ounces grilled skinless, boneless chicken breast
    - Cooked from raw product without adding salt 65 mg
    - Tyson grilled chicken breast fillets 370 mg
  - 1 cup salad greens
    - Field green mix 20 mg
    - Romaine lettuce 0 mg
  - Olive oil and vinegar dressing (for salad)
    - Prepared from scratch without added salt 0 mg
    - Newman's Own bottled dressing 150 mg
  - 5 unsalted or low-sodium crackers
    - Low sodium 160 mg
    - Unsalted tops 150 mg
  - Fruit plate with
    - ¼ cup strawberries = 0 mg
    - ½ sliced orange = 0 mg
    - ½ peach = 0 mg

Food	Lower option	Higher option
Chicken	65	370
Greens	0	20
Dressing	0	150
Crackers	150	160
Fruit	0	0
Total	215	700



How much sodium do you choose to "spend"?

Food	Lower option	Higher option
Chicken	65	370
Greens	0	20
Dressing	0	150
Crackers	150	160
Fruit	0	0
Total	215	700
Running total	385	1305

How do you choose to spend your daily sodium allowance?

- Budget Wisely
  - Eliminate frivolous or wasteful spending
    - Sodium sources you do not truly enjoy
      - Overly salted foods
      - Hidden sodium that does not add flavor
    - Processed foods
    - Frozen foods
- Treat yourself occasionally
  - Eat a half or quarter of a normal portion
  - Eat lower salt for the rest of the day to stay on budget
- Small savings add up
  - Choose items with lower sodium content
  - Remove the salt shaker from the table

AND, n.d.; AHA, 2016; Eckel etal, 2014; Foung, 2013; Kaplan & Olendzki, 2015; NHLBI, 2015.

Funny, They Don't Taste Salty

Salt content as listed on product labels.

TONY CENICOLA/THE NEW YORK TIMES

	COOKIES	WAFFLES	CHICKEN BREAST	GRANOLA BARS	SYRUP	WHEAT BREAD	PITA BREAD	SALAD DRESSING	COTTAGE CHEESE
SERVING	Three Oreos.	Two Eggo waffles.	1/2 cup Perdue, roasted.	Two Nature Valley Oats 'n Honey bars.	1/4 cup Eggo Lite syrup.	1 slice Arnold whole wheat.	1 Damascus Bakeries whole wheat pita.	Two tablespoons Kraft fat-free Italian.	1/2 cup Light n' Lively low-fat.
SALT	160 mg.	410 mg.	460 mg.	160 mg.	180 mg.	170 mg.	290 mg.	480 mg.	420 mg.
PERCENT OF DAILY INTAKE*	11%	27%	31%	11%	12%	11%	19%	32%	28%

*Percentages are calculated from the Institute of Medicine report that recommends 1,500 milligrams of salt each day as adequate for people ages 9-50; an older government standard of a 2,400 milligram daily intake appears on product labels, with correspondingly lower percentages.

	Serving Size	Range of Sodium (mg) per Serving*
Canned soup	1 cup	50-950
Canned vegetables	½ cup	10-550
Sliced bread	1 slice	100-240
Frozen cheese pizza	1 slice	510-1090
Frozen meals	6-10 ounces	330-1130
Tomato juice	8 ounces	140-680
Salad dressing	2 tablespoons	80-620
Salsa	2 tablespoons	90-250
Potato chips	1 ounce	10-380
Pretzels	1 ounce	50-610

*Based on a convenience sample

Always read labels. By choosing your pizza wisely, you can avoid 580 mg of sodium!

Low-Sodium Canned Diced Tomatoes

Nutrition Facts
Serving Size ½ cup (130g)
Servings Per Container 3½

Amount Per Serving	
Calories 25	Calories from Fat 0
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 10mg	1%
Potassium 270mg	8%
Total Carbohydrate 5g	2%

Canned Diced Tomatoes

Nutrition Facts
Serving Size ½ cup (130g)
Servings Per Container 3½

Amount Per Serving	
Calories 25	Calories from Fat 0
	% Daily Value*
Total Fat 0g	0%
Saturated Fat 0g	0%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 150mg	6%
Potassium 230mg	6%
Total Carbohydrate 5g	2%

Lowering Your Sodium Intake

Principles	Foods of Concern	Action Plan
Prepare Food without adding Sodium 	Do you use salty seasonings? Salt, Seasoned salt, Barbecue sauce, Soy sauce, Ketchup, Dry salted fish, Baking powder, Baking soda, Onion salt, Garlic salt, MSG, Soup mixes, Tenderizers, Salted butter, Fish sauce, Bouillon	Add flavor to foods with... • Fresh cracked pepper • Garlic and onion powders • Flavored vinegars • Fresh garlic, ginger, parsley • Lemon juice • Low-sodium broth • Salt-free herb & spice blends • Worcestershire sauce
Eat Fewer Salty Foods 	Do you eat these salty snacks? Salted crackers, Salted chips, Salted popcorn, Salted pretzels, Salted seeds, Salted nuts	Lower sodium choices:
Eat Fewer Cured Foods 	Do you eat salt cured foods? Ham, Deli meats, Sausage, Smoked meats, Koshered meat, Hot Dogs, Bacon, Pickles, Olives, Kim chee	Lower sodium choices: Chill and thinly slice fresh roasted meats for sandwiches.
Eat Fewer Processed Foods 	Do you eat processed foods? American cheese, Baking mixes, Cottage cheese, Flavored rice/pasta mixes, Frozen dinners, Instant hot cereals, Instant noodle lunches, Packaged dinner mixes, Processed cheese spreads	Lower sodium choices: Swiss cheese Rice Oatmeal (not quick-cooking) Pasta

Recipe modifications

- Find recipe you like
  - Do not forget to check out recipes already low in sodium
- Identify sources of sodium
- Replace sources of sodium, with
  - No or low sodium alternatives
  - Make your own replacement using no salt added recipes
    - Condiments, soup, or other prepared recipe additives
- Keep in mind
  - What textures and flavors need to be replaced
  - What spices or herbs could be added or increased
    - Consider combinations used in low sodium cookbooks
  - Consider adding just a little bit of
    - Vinegar or lemon
    - Sugar
  - Be willing to taste multiple times during seasoning process
    - You can always add more but you cannot remove

Foung, 2013; Webb, 2012.

Tips for using Herb blends

- Do not stock up
  - Best if used within on year
  - Share if you cannot us
- Store in cool, dry place
  - Protect from heat and steam
  - Do not sprinkle from container
- Lightly rub herbs to release flavor
- Mrs. Dash salt-free blends
  - Lemon Pepper
  - Italian Medley
  - Garlic & Herb
  - Original Blend
  - Caribbean Citrus
  - Chicken Grilling Blend
- Other brands
  - Check ingredients list for salt/sodium
  - Nutrition fact not always included

Create your own blends

- Lemon pepper
  - 1 tsp lemon zest
  - ¼ tsp fresh ground pepper
- Caribbean blend
  - 3 tbsp minced thyme leaves
  - 1 ½ tbsp ground allspice
  - 1 ½ tbsp sweet paprika
  - 1 tsp orange zest
  - 1/8 tsp ground cloves
  - 1/8 tsp ground nutmeg
- Tandoori blend
  - 1 tsp ground coriander
  - 1 tsp ground cumin
  - 1 tsp sweet paprika
  - ½ tsp garlic powder
  - ¼ tsp ground ginger
  - 1/8 tsp ground cardamom
  - Pinch crumbled saffron

AHA, 2016; Foung, 2013; Kaplan & Olendzki, 2015; Larsen, 2015; NHLBI, 2015; Webb, 2012.

Tips for herbs

Basil

- Flavor
  - Hints of cloves and licorice
- Different varieties
  - Lemon basil
    - Use in drinks and fruit
  - Purple basil good in salads
  - Thai basil good in curries

Chives

- Mild onion flavor
  - Best in cold dishes

Cilantro

- Strong flavor, hints of anise
  - Use sparingly
- Pairs well with
  - Cumin, turmeric, paprika
  - Lemon, lime
  - Curry

Mint

- Fresh, cool flavor
- Brings out sweetness

Foung, 2013; Webb, 2012.

Tips for herbs (continued)

Oregano
- Strong aroma and flavor
- Good with
  - Vinaigrettes
  - Fish, Poultry, Meats
  - Soups, sauces, stews
- Close relative is Marjoram
  - Milder flavor than oregano

Parsley
- Fresh, mild bright flavor
- Add to almost anything

Rosemary
- Strong lemony, pine-like flavor
  - Small amount (overpowering)
    - Avoid medicinal taste
- Pair with parsley or thyme

Thyme
- Vibrant, lemon-mint flavor
  - Strong but not overpowering
  - Works well combined with other herbs
- Good with
  - Lamb
  - Tomatoes
  - Peas
- Try with many other foods

Foung, 2013; Webb, 2012.

Exotic herbs and spices

Chinese 5-spice
- Blend of star anise, cloves, cinnamon, peppercorns, fennel
- Strong, warm, rich flavor
- Suggest keeping shaker on table

Cinnamon sticks
- Milder than ground cinnamon
- Sweet, citrusy flavor

Whole Cloves
- Strong, potent aroma and flavor
- Best used with sweet spices like nutmeg or cinnamon
- Good with ham, oranges, fruit sauces, and stews

Crystallized ginger
- Dehydrated, sugar crusted ginger
- Warm, sweet flavor
- Mince and add to
  - Salads, dressings
  - Green vegetables
  - Desserts

Garam masala
- Blend of warm spices
  - Chili, cloves
  - Mace, cinnamon, cardamom
  - Coriander, peppercorns, ginger, nutmeg
- Good with vegetables, Indian dishes

Foung, 2013; Webb, 2012.

Exotic herbs and spices (continued)

Herbes de Provence

- Blend of savory, basil, thyme, fennel, and lavender
- Good will grilled dishes
- Flavor enhanced by cooking
  - Do not add after cooking complete

Kaffir lime leaves

- Mild lime flavor and aroma
- Common in Thai and Asian cooking

Whole Peppercorns

- Rich, winey, hot flavor
- Most common spice
- Many varieties available
- Best if fresh ground

Saffron

- Delicate flavor with yellow color
  - Always use threads, not powdered
- Confused with Tumeric
  - Stronger with yellow color
  - Peppery, gingery flavor

Star anise

- Very strong and fragrant
  - Warming spice

Foung, 2013; Webb, 2012.

Suggested salt-free flavor pairings

- Beef
  - Basil, bay leaf, caraway, curry, dill, dry mustard, garlic, grape jelly, green pepper, mace, marjoram, mushrooms, nutmeg, onion, parsley, pepper, rosemary, sage
- Chicken
  - Basil, cloves, cranberries, mace, mushrooms, nutmeg, oregano, paprika, parsley, pineapple, saffron, sage, savory, tarragon, thyme, tomato, turmeric
- Desserts
  - Allspice, anise, cinnamon, cloves, ginger, mace, nutmeg, vanilla, other extracts
- Egg
  - Chervil, curry, dill, dry mustard, garlic, green pepper, jelly, mushrooms, nutmeg, onion, paprika, parsley, rosemary, tarragon, tomato
- Fish
  - Basil, bay leaf, chervil, curry, dill, dry mustard, green pepper, lemon, marjoram, mushrooms, paprika, pepper, tarragon, tomato, turmeric
- Lamb
  - Cloves, curry, dill, garlic, mace, mint, mint jelly, onion, oregano, parsley, pineapple, rosemary, tarragon, thyme
- Pork
  - Applesauce, basil, caraway, chives, garlic, onion, rosemary, thyme
- Veal
  - Apricots, basil, bay leaf, currant jelly, curry, ginger, marjoram, mushrooms, oregano, paprika
- Vegetables
  - Basil, dill, garlic, ginger, lemon, mace, marjoram, nutmeg, onion, tarragon, tomato, sugar, vinegar

Foung, 2013; Webb, 2012.

Be encouraged!

- Give yourself time for taste to adjust
- Soon you will discover more flavors
  - Delicate flavors masked by salt
  - New seasoning you tried
  - New recipes you create and share
- You are not alone
  - Low sodium recipes
    - Books
    - Online
  - Check out websites
    - Government nutrition and health sites
    - Health agency sites
    - Disease specific support group sites
    - Social media sites
- Be persistent
  - Your health may thank you!

Foung, 2013; Webb, 2012.

References

Academy of Nutrition and Dietetics (AND, n.d.). Heart Failure Nutrition Therapy (Patient handout). Eat Right. Academy of Nutrition and Dietetics.

American Heart Association, (AHA, 2016). How much sodium should I eat per day? American Heart Association/American Stroke Association. Retrieved from www.sodiumbreakup.heart.org/sodium-411/how-much-sodium-do-you-need

Eckel etal (2014). 2013 AHA/ACC Guideline on Lifestyle management to reduce cardiovascular risk: A report of the American College of Cardiology/American Heart Association Task Force on practice guidelines. *Journal of American Colleges of Cardiology*. 2014:63(25_PA). doi: 10.1016/j.jacc.2013.11.003

Goldman-Foung, J. (2013). *Sodium Girl's Limitless Low-Sodium Cookbook*. Hobken, NJ: John Wiley & Sons, Inc.

Jacksonville University (2016). Nurses Effectively Teaching Healthcare to Patients. Retrieved from http://www.jacksonvilleu.com/resources/nursing/nurses-teaching-patients/#.V5rIw7IAOko

Kaplan, N. and Olendzki, B. (2015). Patient information: Low-sodium diet (Beyond the basics). UpToDate. Retrieved from www.uptodate.com/contents/low-sodium-diet-beyond-the-basics

Larsen. L. (2015). *The Big Book of Low-Sodium Recipes*. Avon, MA: F+W Media Inc.

National Heart, Lung, and Blood Institute (NHLBI, 2015). Description of the DASH eating plan. Retrieved from http://www/nhlbi.nih.gov/health/health-topics/dash

Sarmugam, R. and Worsley, A. (2014). Current levels of salt knowledge: A Review of the Literature. *Nutrients*, 6, 5534-5559, doi:10.3390/nu6125534

Webb, R. (2012). *You Won't Believe It's Salt-Free!* Boston, MA: Da Capo Press.