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ASSESSMENT OF CHRONIC DYSPNEA IN OLDER ADULTS:
IMPACT OF THE DYSPNOEA-12 QUESTIONNAIRE ON NURSE SELF-EFFICACY

by

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This capstone, submitted by Illaria C. Moore in partial fulfillment of the requirements for the Degree of Doctor of Nursing Practice from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

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PERMISSION

Title Assessment of Chronic Dyspnea in Older Adults: Impact of the
Dyspnoea-12 Questionnaire on Nurse Self-Efficacy

Department Nursing and Professional Disciplines

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Abstract

Chronic dyspnea is a potent, independent predictor of mortality and is prevalent in older adults, yet assessment is inadequate and validated instruments are lacking. Under-reporting and poor perception are common, and older adults develop self-restriction strategies in order to improve breathing and quality of life. Chronic dyspnea-related diagnoses result in 32% of inpatient admissions for community-dwelling elders in the capstone study setting, but nurses do not use a validated dyspnea assessment instrument. Professional organizations universally recommend multidimensional assessment of dyspnea to improve early recognition of exacerbation. Emerging evidence indicates that a brief patient-reported questionnaire format may be the most reliable way to measure chronic dyspnea in the clinical setting. The DNP capstone explored the impact of using the Dyspnoea-12 Questionnaire (D-12) on nurse self-efficacy related to dyspnea assessment. Nurses were surveyed for six domains of self-efficacy before and after two months of patient assessment with the D-12. In spite of the small sample size ($n = 10$), improvement in nurse self-efficacy was demonstrated as a result of the intervention ($\chi^2 = 7.054$ [$p = .008$]; $\phi = 0.108$, [$p = .008$]). Nurses recommended the D-12 in patients with chronic dyspnea and at initial assessment, but not for universal use. Future research of the mD-12 in larger patient cohorts in varied settings, and further study of assessment efficacy in practicing nurses is recommended.

Assessment of Chronic Dyspnea in Older Adults: Impact of the Dyspnoea-12
Questionnaire on Nurse Self-Efficacy

Background and Significance

Dyspnea is a symptom that nurses commonly encounter, affecting up to half of patients in acute care, and one-quarter in ambulatory care settings (Charles, Ng, & Britt, 2005; Parshall et al., 2012). Chronic dyspnea is experienced by 25-46% of community-dwelling adults aged 70 or older (Ahmed, Steward, & O'Mahony, 2012; Ho et al., 2001; van Mourik et al., 2014; Mullerova, Lu, Li, & Tabberer, 2014), and is a common complaint for older adults presenting to emergency departments and inpatient settings (Ahmed et al., 2012). Independent of age, gender, lung function, smoking, body mass index, and comorbidities, chronic dyspnea is a potent predictor of mortality that is associated with a 1.3 to 2.9 times greater risk of all-cause mortality at a 95% confidence interval (Berraho et al., 2013; Pesola & Ahsan, 2014).

Dyspnea is the sensation of difficult or uncomfortable breathing (Mukerji, 1990). Definitions of chronic dyspnea vary widely in clinical and research literature (Bausewein, Farquar, Booth, Gysels, & Higginson, 2006). Mahler and colleagues (2010) defined chronic dyspnea as difficult breathing that persists at rest, with minimal activity, or is distressful despite optimal therapy of advanced lung or heart disease (p. 674), versus Spector, Connolly, & Carlson (2007) who characterize chronic dyspnea as long-term, persistent, and varying in intensity. The most commonly used definition of dyspnea is that of the American Thoracic Society (ATS):

“A subjective experience of breathing discomfort that consists of qualitatively distinct sensations that vary in intensity...The experience of dyspnea derives from

interactions among multiple physiological, psychological, social, and environmental factors, and may induce secondary physiological and behavioral responses...but we emphasize strongly that dyspnea per se can only be perceived by the person experiencing it. Perception entails conscious recognition and interpretation of sensory stimuli and their meaning. Therefore, as is the case with pain, adequate assessment of dyspnea depends on self-report” (Parshall et al., 2012, p. 437).

Dyspnea in older adults is complex, multifactorial, progressive, and characterized by repeated exacerbations. It is associated with chronic cardiorespiratory conditions such as heart failure (HF) and chronic obstructive pulmonary disease (Mahler et al., 2010; Parshall et al., 2012). Dyspnea is the most important disability-inducing factor in chronic obstructive pulmonary disease (COPD), greater than stage of illness or comorbidity (Braido et al., 2011). In a study comparing stable individuals with COPD and HF, researchers found that 100% reported dyspnea, yet no significant difference in the frequency of dyspnea, as measured by the number of times per month “severe to very severe dyspnea”. However, day-to-day intensity of dyspnea was significantly higher in subjects with COPD (de Souza Caroci & Lareau, 2004, p. 109). A review of nearly 500,000 Medicare patients demonstrated that dyspnea and pain commonly occur, develop, and resolve together (Clark et al., 2014). “Breathlessness generates suffering across the community for patients and their caregivers often for long periods” (Currow, Higginson, & Johnson, 2013, p. 932).

Ineffective Recognition and Treatment

Although thorough and accurate assessment is the universal cornerstone of clinical care and treatment, numerous authors emphasize that deficient assessment of chronic dyspnea is fundamentally associated with ineffective recognition, treatment, management, and outcomes related to cardiorespiratory conditions in older adults. Prompt recognition of the signs and symptoms of exacerbation in tandem with appropriate medication management can help prevent hospitalization in HF (Schipper, Coviello, & Chyun, 2012). Dyspnea is a predictor of hospitalization in COPD (Ong, Earnest, & Lu, 2005).

The American College of Chest Physicians (ACCP) in their 2010 Consensus Statement on the Management of Dyspnea stated, "...patients with advanced lung or heart disease are not currently being treated consistently and effectively for relief of dyspnea" (Mahler et al., 2010, p. 674). Improved assessment of chronic dyspnea is critically needed to enhance earlier recognition, guide management and treatment, as well as impact avoidable hospitalization and decrease unnecessary healthcare expenditures.

Older Adult Population and Dyspnea

For the purposes of this capstone, older adult is defined as an individual 65 years of age or older. There are 44.3 million Americans in this age group, 14.1% of the total population, more than at any other time in United States (U. S.) history (United States Census Bureau [USCB], 2013). The USCB projects that the population aged 65 and older will continue to grow dramatically until 2030, stabilizing at approximately 20% of the total population. However, as "Baby Boomers" (people born between 1946 and 1964) age to 85 and older, their numbers are expected to nearly quadruple from 5.5 million in 2010

to 19 million by 2050 (Federal Interagency Forum on Aging-Related Statistics [FIFA], 2012, p. 22).

U. S. Older Population Change			
Year	Aged ≥ 65 years	% Total U. S. population	Aged ≥ 85 years
1900	3 M		100 K
2000	35 M		
2010	40 M	13%	5.5 M
2030	72 M	20%	
2050			19 M

Figure 1 U. S. Older Population Change (FIFA, 2012)

Due to the growth in the aging population, the prevalence of older adults with dyspnea will also rise. “Dyspnea, or breathlessness, is the most common symptom reported by patients with COPD and CHF seeking medical help” (de Souza Caroci, & Lareau, 2004, p. 102). Heart failure affects more than 5 million Americans; 12.7 million have diagnosed COPD (American Lung Association, 2014). Increasing age is associated with increasing prevalence in both diseases. COPD prevalence doubles each decade past middle age (Centers for Disease Control and Prevention, 2015), while HF increases 10-fold between from age 60 to 80 (Go et al., 2014). COPD prevalence is 19.2% in Americans aged 70 or older (Buist et al., 2007), and projections indicate that COPD will become the third leading cause of death by 2030 (World Health Organization, 2008). Americans aged 80 or older have a 12.8-14.7% prevalence of HF (Azad & Lemay, 2014) with total population numbers expected to grow in association with an overall aging population.

Gaps in Care

The clinical setting where this Doctor of Nursing (DNP) capstone was conducted is an outpatient department providing primary care in the place of residence to a cohort of 140-150 majority older adults with chronic disease. Cardiorespiratory-related conditions

(CHF, COPD [including bronchitis], pneumonia, pulmonary fibrosis, respiratory failure and shortness of breath [SOB]) account for 32% of acute care admissions for the patient population—the most prevalent disease category. Hereafter, the capstone setting will be referred to as *Site*.

Local nursing policies mandate the use of Lippincott's Manual of Nursing Procedures (Nettina, 2014) for dyspnea assessment, which requires physical assessment and use of a single-item dyspnea assessment scale. *Site* nurses auscultate heart and lungs, take vital signs, oximetry and consistently ask, "Are you short of breath?" Current adherence only partially meets the standard of care; if the patient denies being short of breath, no scale is utilized. However, *Site* practices are consistent with general practice in that nursing dyspnea assessment usually does not include a validated tool (Baker et al., 2013; Doran et al., 2014).

Home Care Practice

Effective nursing assessment of elderly adults with chronic dyspnea in the community setting and related decision-making is a challenging dilemma, calling for study and creative clinical practice improvements. A group of nurse researchers who retrospectively investigated the application of clinical evidence to outcomes in home care stated, "There are gaps in knowledge about the extent to which home care nurses' practice is based on best evidence and whether evidence-based practice impacts patient outcomes" (Doran et al., 2014, p. 274). Doran and colleagues (2014) noted that the home is an unpredictable environment, healthcare visits are short and episodic, nurses have more autonomy, and care is a shared approach with informal caregivers (p. 274). Of a total of 978 reviewed charts, 909 patients were assessed for dyspnea on admission (93%),

25.4% of which had dyspnea. Ninety-four percent had dyspnea present on both admission and discharge: only 10% showed improvement during the course of care, and dyspnea was unchanged or worse in 90%. Of the 20 evidence-based dyspnea interventions studied, only 5 were documented in 90% of the appropriate cases. Significant dyspnea score changes were associated with older age and a greater number of dyspnea interventions. Dyspnea was assessed via a single nurse-defined measure (0 = *absence of symptoms* to 3 = *present at rest*) of intensity (pp. 277-278). This study demonstrated that while home care nurses assessed dyspnea 93% of the time at admission, they did not elicit patient-reported indicators or physical factors such as oximetry with ambulation, nor did they employ more than 5 of 20 evidence-based interventions in their care (p. 278). This large, very current study confirms the need for improvements in dyspnea assessment quality and consistency in the home care setting.

Recliner Sleep Behavior

Dyspnea is recognizable in the home care environment where many elderly people sleep in a recliner chair rather than a bed, often for many years. An exhaustive literature review conducted between October and December 2014 failed to identify any publications that addressed the prevalence or problem of recliner sleep behavior. This author informally interviewed four experienced home care nurses and the Chiefs of Pulmonary and Physical Medicine and Rehabilitation in the local organization. All agreed that recliner sleep is a common phenomenon, but could likewise not identify any germane clinical or epidemiological evidence. Notably, while they agreed that people often sleep in recliners due to orthopnea or other respiratory-related issue, these experienced

clinicians were intrigued to have previously not considered recliner sleep behavior as a potential indicator of dyspnea that could/should be included in regular assessment.

Theoretically, the foot-elevated semi-fowler's position afforded by a recliner chair is a self-care measure to relieve orthopnea, defined as an increase in dyspnea while supine (Eltayara, Ghezzi, & Milic-Emili, 2001), or onset/worsening of dyspnea when shifting from the sitting to the supine position (Duguet et al., 2000). Orthopnea is a known risk indicator of poorly managed or progressive HF and COPD (Beck da Silva et al., 2004; Boni et al., 2005; Duguet et al., 2000; Eltayara et al., 2001; Mukerji, 1990; Torchio et al., 2006).

Self-Restriction Strategies

Patients with chronic dyspnea, especially the elderly, develop a significant decrease in exercise tolerance that is directly proportionate to degree of airflow limitation. In an attempt to prevent worsening dyspnea, patients self-restrict physical activity, leading to a cycle of increasing exercise intolerance, progressive dyspnea, exacerbations, hospitalizations, and mortality. As activity of self-restriction and lifestyle adaptation becomes chronic, patients may underestimate the severity of their own condition (van der Molen, Miravittles, & Kocks, 2013, p. 463). Perhaps recliner-sleeping behavior could be one such strategy that chronically dyspneic older adults use to control or adapt to orthopnea. Considering the clear ACCP consensus statement (Mahler et al., 2010) and perplexing observation of chronic recliner sleep behavior, healthcare professionals may be missing an opportunity to recognize worsening respiratory status by not consciously including queries about sleeping posture in nursing dyspnea assessments.

Altered Symptom Reporting in the Elderly

Given that exacerbations of chronic cardiorespiratory conditions can be mitigated or managed prior to escalation and need for hospitalization, early recognition of signs and symptoms is critically important. However, in the elderly, self-perception and report of symptoms is a challenge. While older adults experience more dyspnea, their accuracy at detection and interpretation of early symptoms is worse than younger counterparts (Jurgens, Hoke, Byrnes, & Riegel, 2009). For example, a study of 103 patients found that those who scored five or more on a dyspnea visual intensity scale also answered “no” to the question “Are you short of breath?” (MacDonald, Yates, Lance, Giganti, & Chepurko, 2005, p. 260), indicating significant incongruity between younger and older adults in accurately reporting dyspnea. Petersen, von Leupoldt, & Van den Bergh (2014) found that self-report of dyspnea is more highly correlated with biopsychosocial factors than actual physiological changes, concluding that dyspnea has subjective aspects similar to pain that need to be considered when assessing (p. 94). These physiological and psychological changes in aging are not fully understood, and studies are inconsistent (Petersen et al., 2014).

Theoretical Framework: Self-Efficacy Theory

Care of the chronically dyspneic older adult is an on-going interaction between patient and nurse to mutually identify the severity of symptoms and to provide individualized care that is based on optimal assessment. Having discovered that comprehensive assessment of chronic dyspnea is endorsed in the literature as generally deficient in clinical healthcare, the decision was made to investigate nurse self-efficacy

related to assessment of chronic dyspnea. Therefore, Bandura's theory of self-efficacy (1977) was chosen as the theoretical model for this capstone.

Self-efficacy (SE) is a concept first developed and described by Albert Bandura (1977) to explain and predict behavioral change. "Perceived self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves and behave" (Bandura, 1994, p. 71). The author hypothesized, "Expectations of personal efficacy determine whether coping behavior will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and aversive experiences" (Bandura, 1977, p. 191).

A foundational concept of SE is that while cognitive processes can and do mediate behavioral change, mastery evolves best through effective performance. Four principle sources of information lead to SE: performance accomplishments, vicarious experience, verbal/social persuasion, and physiological states (Bandura, 1977, p. 191). Performance accomplishment is essentially practice that leads to the accumulation of experience and skills (Shortridge-Baggett, 2002), and is the most influential of the four information sources (Bandura, 1977). Vicarious experience is observation of desired behavior in similar others, and can influence the observer to believe that successful capability and mastery are possible for her/him. Verbal/social persuasion is the receipt of positive encouragement and/or reinforcement of expected behaviors from respected mentors or co-workers. Self-appraisal is the judgment of one's own capabilities through internal cues. Feedback is received through personal physiological and psychological responses (Shortridge-Baggett, 2002). The four information sources would suggest that

through the introduction and use of a clinical assessment tool, nurses in the chosen capstone practice site would have the opportunity to increase self-efficacy. Hence, Bandura's SE Theory underpins the design of this capstone (see Appendix A).

Self-efficacy is often operationalized in SE scales as a subject's "confidence" in his/her ability to perform specific tasks or impact behaviors. "Confidence" is considered to be an appropriate modifier for questionnaires (Sheer, 2014, p. 88). Therefore, the use of the term "confidence in" is used in the pre and post-test questions related to nurse self-efficacy in this capstone. However, it is important to understand that **self-efficacy** and **self-confidence** are not synonymous (Lorenz, Gregory, & Davis, 2000, p. 183).

Literature Review

The evidence of impaired symptom recognition/reporting and altered sleeping posture in elders with chronic dyspnea, limited application of evidence based practice by home care nurses, and the high general and local site prevalence of chronic dyspnea clearly warrant improvements in nursing practice related to dyspnea assessment. A review of the literature to determine the most effective strategies to address or impact nursing practice related to self-efficacy of dyspnea assessment, as well as the most appropriate clinical dyspnea assessment tool was conducted.

Description of Search Strategies

Numerous keywords were used to search the literature: dyspnea, dyspnoea, breathlessness, assessment, instrument, tool, scale, questionnaire, nurse, recliner sleep, chair, reclining sleep, and sleep posture. The search was limited to English language publications and human subjects. PubMed, CINAHL, and Google Scholar were the main databases utilized. All retrieved materials were extensively hand-searched. Where an

author was noted to have published several pieces of relevant literature, a SCOPUS search was conducted.

Clinical Practice Guidelines

One evidence-based nursing plan of care for the assessment, planning, intervention, and evaluation for dyspnea was discovered (Spector et al., 2007). The plan includes ten elements, including that dyspnea should be assessed from the patient's perspective whenever possible via an assessment instrument (*Level V evidence*). Dyspnea assessment should include: quality and timing of dyspnea; alleviating and precipitating factors; associated symptoms; physical assessment and pulmonary function measures as indicated; pulmonary factors such as hypoxia or increased work of breathing; and non-pulmonary factors such as pain, anxiety, depression, and fluid overload (p. 53).

No clinical practice guideline (CPG) specific for dyspnea currently exists in the National Guideline Clearinghouse, but a comparable guideline and supplement for COPD was discovered. The CPG recommendations are:

Recommendation 1.0 - Nurses will acknowledge and accept the patients' self-report of dyspnea (*Level of Evidence = IV*).

Recommendation 1.1 (updated 2010) - All individuals should be assessed; assessment should include: 1) Level of dyspnea - If able to self-report, measure using a quantitative scale such as a visual analogue or numeric rating scale. If unable to self-report, present level of dyspnea should be measured using a quantitative scale such as the Respiratory Distress Observation Scale (RDOS); 2) Usual level of dyspnea – Use a quantitative scale such as the Medical Research Council Dyspnea Scale; 3) Vital signs, pulse oximetry, chest auscultation, chest shape, movement, and abnormalities, peripheral edema,

accessory muscle use; 4) Presence of cough/sputum; 5) Ability to complete a full sentence; 6) Level of consciousness; and 7) Swallowing difficulties (*Level of Evidence = IV*; Registered Nurses' Association of Ontario [RNAO], 2010).

Nurse Self-Efficacy

An exhaustive literature review revealed voluminous information focused on nursing student and patient-focused populations related to self-efficacy. However, only six relevant studies were identified related to SE in practicing nurses (Fry, MacGregor, Hyland, Payne, & Chenoweth, 2015; Fry & MacGregor, 2014; Johnson, Hong, Groth, & Parker, 2010; Manojlovich, 2005; Welsh, 2014; Winslow, DeGuzman, Kulbok, & Jackson, 2014). The literature demonstrated that SE is a positive mediator in professional practice behaviors (Manojlovich, 2005), competency (Welsh, 2014), and clinical decision-making (Fry & MacGregor, 2014). Self-efficacy is a critical attribute in quality, compassionate clinical care, and important for the acquisition of skill and knowledge (Fry et al., 2015). There is a demonstrated association between learning and development in practicing nurses and work attitudes and performance (Johnson et al., 2010). Additionally, nurses who pursue academic advancement beyond initial preparation have higher SE, but not at the level of statistical significance (Winslow et al., 2014).

Manojlovich (2005) theorized that SE would positively impact nursing practice behaviors by interacting with nursing leadership and structural empowerment to move practice toward more professional and less task focused behavior. The author surveyed 500 Michigan nurses, with a 73% return rate, finding that structural empowerment contributed to professional practice behaviors indirectly through self-efficacy. The author concluded that if partially mediated through SE, professional nursing practice might

improve when the environment offers nurses opportunities and power through resources, support, and information (p. 271). Johnson and colleagues (2010) conducted a correlational survey of 404 nurses “at all grades and teams” (p. 612), and demonstrated that nurses with role-breadth self-efficacy (the perceived capacity to perform a broad range of roles) were more likely to have higher clinical performance and work attitudes (p. 609).

In a multicenter study of 52 participant emergency room nurses, Fry & MacGregor (2014) found SE to be an important factor in clinical decision-making, recommending educational strategies to support self-confidence (tested as self-efficacy) and resilience (p. 91). Further, Fry and coworkers (2015) followed-up with a study of 80 emergency department nurses in multiple centers, demonstrating that SE was gained through “nursing praxis”, defined as the sum of nursing experiences (p. 1623). The authors concluded that nursing experience, self-efficacy, confidence, and personal relationships were reflexive in that they were acquired as a result of practice and are important enablers of appropriate, timely and compassionate care (p. 1628).

Welsh (2014) concluded that although nurse self-efficacy is an important characteristic of general nursing competency, literature is currently limited. With the aim of a developing a greater understanding of practice ability and skill enhancement, the author developed and tested a 16-item Nursing Care Self-Efficacy Scale (NCSES) that demonstrated early validity and reliability. Germane to the question of nurse self-efficacy related to assessment of chronic dyspnea assessment explored in this capstone, Welsh notes that her NCSES instrument is meant to measure SE with respect to the five

fundamental components of the nursing process (assessment, diagnosis, planning, implementation, and evaluation), the first of which is assessment (Welsh, 2014, p. 374).

Inadequate Dyspnea Assessment

Numerous authors concluded that the assessment of dyspnea is inadequate and use of validated measures of dyspnea are lacking (Jones, Price, & van der Molen, 2011; Mahler et al., 2010; Parshall et al., 2012; Yorke & Savin, 2010; Yorke, Moosavi, Shuldham, & Jones, 2010). Researchers agreed that conventional measures of respiratory function such as spirometry and peak flow in COPD and brain natriuretic peptide and arterial blood gases in HF do not correlate well with dyspnea and the associated impact on quality of life (Crisafulli & Clini, 2010; Parshall et al., 2012; van der Molen et al., 2013). Improved management requires a combination of assessments that include physical function, exacerbation history, and impact on overall functional status. Socrates & Mebazaa (2009) endorsed that tools can be utilized to measure dyspnea regardless of the underlying etiology (p. 639). Numerous authors concluded that there is not enough current evidence to recommend any specific measurement tool (Bausewein et al., 2006; Jones, Miravittles, van der Molen, & Kulich, 2012; Mularski et al., 2010; Weldam, Schuurmans, Liu, & Lammers, 2013); neither the ATS nor ACCP Consensus Statements recommended a particular instrument (Mahler et al., 2010; Parshall et al., 2012).

There is emerging evidence that a short patient-reported questionnaire format may be the most reliable way to measure chronic dyspnea in the clinical setting (Jones et al., 2011; Jones et al., 2012; Mahler et al., 2010; Yorke & Savin, 2010). To fully characterize disease burden, patient-reported outcomes should be followed independent to physical outcomes (Oga et al., 2007). A structured review of respiratory questionnaires concluded:

“Patient-reported outcome measures (PROMs) offer enormous potential to improve the quality and results of health services. They provide validated evidence of health from the point of view of the user or patient” (Davies, Gibbons, & Fitzpatrick, 2009, p. 3).

Dyspnea Assessment Instruments

Historically, dyspnea has been assessed either directly through single item scales in patients at rest or during varying types of exercise or levels of exertion, and indirectly through queries of activities that are impaired due to breathlessness or impact of symptoms on quality of life. Direct measures do not capture the complexity of dyspnea, and indirect measures do not measure intensity of dyspnea itself, but rather are measuring the impact of dyspnea on physical activity, function, or quality of life (Yorke et al., 2010, p. 21). Also, the majority of tools were developed and validated only for use in COPD or for use in research rather than clinical practice (Bausewein et al., 2006; Jones et al., 2012; Yorke & Savin, 2010).

One systematic review (SR) of measurement instruments for breathlessness in clinical care was discovered. Bausewein and colleagues (2006) identified 33 dyspnea assessment instruments meeting inclusion criteria. A summary of their comprehensive findings is as follows:

- No one tool is comprehensive enough. Combining a unidimensional (e. g. Visual Analog Scale) tool and disease-specific or multidimensional tool (Chronic Respiratory Disease Questionnaire) is recommended (pp. 399-400).
- A lack of universal definition of breathlessness or dyspnoea (sic) hinders analysis and comparison of instruments (p. 406).

- Most instruments were developed for COPD, with some tested in healthy individuals. Validated tools include 6/11 in respiratory disease, 1/11 in HF, and 3/11 in cancer (p. 403)
- Six are self-administered, three are interviewer or computer completed, and two are mixed (p. 403).
- Of the 33 instruments reviewed, the following were measured: severity (25), frequency (10), distress (7), intensity (4), associated symptoms (17), functional status questions (28), psychological dimensions (15), social dimensions (13), spiritual dimensions (0), and palliative care in malignant disease (4; p. 406).

Refer to Appendix B for a more complete summary of the specific instruments.

(Note that the Dyspnoea-12 instrument was published after this 2006 SR was published.

Jones and colleagues (2012) acclaim the Dyspnoea-12 as “a novel approach” with importance “yet to be established” [p. 701]).

Dyspnoea-12 Questionnaire

The Dyspnoea-12 Questionnaire (Yorke et al., 2010) was chosen for this capstone because it has been validated in multiple diagnoses, is patient self-reported, is short and quick enough to be appropriate for clinical use, is not limited to measuring dyspnea against an index activity, and demonstrates adequate sensitivity to appreciate changes in intensity and severity (Yorke et al., 2010). The Dyspnoea-12 Questionnaire (D-12) is a 12-item measure of the severity of dyspnea in physical and affective domains. Each question is assigned a patient-reported value on a 0-3 scale of “check this none” = 0, “mild” = 1, “moderate” = 2, or “severe” = 3 for a possible score of 0 (least dyspnea) to 36 (most dyspnea).

Yorke and colleagues (2010), a team of two PhD nurses, an exercise physiologist, and a pulmonologist physician developed the D-12. Through an extensive English language literature review, the researchers identified 81 descriptors of dyspnea and breathlessness. These 81 descriptors were then validated in patients with COPD, HF and interstitial lung disease, statistically analyzed, and distilled down to 12 descriptor phrases in two categories: physical and affective. The tool has since been validated in asthma and pulmonary hypertension, and is currently being translated into other languages (Yorke, & Savin, 2010; Yorke et al., 2010; Yorke & Armstrong, 2014).

Project Purpose

The purpose of this DNP capstone was to investigate whether the use of a patient self-reported dyspnea assessment questionnaire would improve nurse self-efficacy related to dyspnea assessment. The project surveyed the self-efficacy and satisfaction of *Site* nurses related to dyspnea assessment before and after a two-month period of using the validated Dyspnoea-12 Questionnaire (Yorke et al., 2010) during patient visits. For purposes of the capstone, the complete unaltered Dyspnea-12 Questionnaire served as the first section of the assessment tool. For the capstone study instrument, a second section was added to assess for recliner sleeping behavior. This final 2-part assessment tool will be referred to as the “Dyspnea-12 with modifications” (mD-12), and this language is used throughout the remainder of the paper. The mD-12 (see Appendix C) was formatted for use as a clinical template, and was envisioned as being embedded into the electronic medical record (EHR) to promote nurse efficiency, ease of use, and documentation.

Based on the one-group pre/post-test design of the capstone, the survey instruments were developed based on extensive literature review of Bandura’s published

materials on self-efficacy (Bandura, 1977; Bandura, 2006; Sheer, 2014) and the primary investigator's experience with chronically dyspneic patients. The pre-test and post-test instruments can be found in Appendices D and E respectively. Other topics investigated were: nurse opinion of the template and process, rate of template utilization, and inpatient admission rate for cardiorespiratory related conditions during the period of clinical template use.

Capstone Goals and Objectives

1. To improve nurse self-efficacy related to assessment of chronic dyspnea in older adults.
 - a. At least 90% of the nurse study group will demonstrate improved self-efficacy scores on the post-test survey immediately following the data collection phase (13 March 2015).
 - b. At least 85% of the nurse study group will demonstrate satisfaction with the clinical template based on qualitative responses to the post-test survey (16 March 2015).
2. To improve management of chronic dyspnea in community-dwelling older adults.
 - a. By the end of the data collection phase (13 March 2015), at least 90% of patient visits will have dyspnea assessed utilizing the dyspnea clinical template.
 - b. During the two-month data collection phase while the clinical template is in use, total inpatient admissions for cardiorespiratory related conditions will drop at least 5% from baseline (32% of total admissions) for *Site* patients.

Design and Methods

Ethics and Protection of Human Subjects

The University of North Dakota (UND) Internal Review Board granted ethics approval for the capstone as an exempt research study. The primary investigator's *Site* organization Nursing Evidence Based Practice (EBP) Work Group granted approval as an EBP project exempt from Internal Review Board (IRB) procedures. No consent forms were required by either body, as completion of pre-test and post-test forms served as implied consent. No compensation was provided. Confidentiality and privacy were assured to subjects at outset, and maintained through storage on internally encrypted computer spreadsheets or locked in the main investigator's office. Due to UND IRB requirements, data will be maintained for three years and then destroyed in compliance with stringent internal *Site* policies. Further, in order to safeguard the anonymity of a very small study group, no demographic data was gathered. The elderly adults whom the nurses assessed during the capstone were a potentially vulnerable population, but enjoy(ed) rigorous site-specific safeguards and oversight during the study period through three years of required storage.

Setting and Organization

This DNP capstone was conducted within an outpatient department where primary care is delivered in the place of residence to a cohort of 140-150 majority older adults with chronic illness. The full interdisciplinary team of 25 included a nurse program director, two part time physicians, three certified nurse practitioners, nine registered nurses, two clinical pharmacists, two social workers, and one each: psychologist, physical therapist, occupational therapist, physical therapy assistant, and registered dietician.

The setting was an outpatient department of a governmental healthcare organization that resides in a Western United States city of 300,000 and provides healthcare services to 94,000 individuals on an annual budget of \$160 million. A staff of 980 supports an on-site outpatient department, a 46-bed secondary care hospital, an 11-bed in-patient substance abuse ward, and a 28-bed skilled nursing facility (SNF) with 8-bed hospice unit, and three community outpatient clinics at a distance from the main campus. The organization delivers 10,995 acute care visits, 6,659 SNF bed days of care, and 213,565 ambulatory care visits annually. The umbrella organization of the local *Site* employs a total of 243 RNs.

Population Description

The study population was registered nurses and nurse practitioners employed within an outpatient department providing primary care in the place of residence to a cohort of 140-150 majority older adults with chronic disease. For the purposes of this project, nurse was defined as a registered nurse (RN) or Nurse Practitioner (NP) employed at the *Site*, including nine RNs and two NPs (in addition to the primary investigator). Because the *Site* had a small staff, a decision was made to include all nurses irrespective of level of education or practice in order to boost the capstone sample size. In the *Site*, 77.7% (7 of 9) RNs hold bachelor's degrees and 22% (2 of 9) hold master's degrees. In terms of gender, two (22%) of the *Site* nurses are male. All *Site* RNs are Caucasian and aged 46 years or younger.

Design

The capstone design was a one group pre and post-test design (Issel & Handler, 2013) to measure nurse self-efficacy related to assessment of chronic dyspnea. The study

population was drawn from a purposive convenience sample of available RN and NP staff at the *Site* who were analyzed as a group through anonymous unmatched pre-test and post-test surveys in order to meet expedited UND and *Site* IRB constraints. This design was chosen for its straightforward applicability to evidence based practice, and accessibility to a targeted nurse/older adult population. The design included quantitative analysis to investigate nurse satisfaction with the template, ideas for revision, and clinical practice improvements that may result from participation in the study. All *Site* RNs (9) and NPs (2) were invited to participate voluntarily. Data collection was conducted for nine weeks.

Subjects were asked to use the Dyspnea-12 Questionnaire with additional questions to assess for sleeping posture during all patient visits and document each assessment in the electronic health record (EHR) template. The complete unaltered D-12 Questionnaire served as the first section of the capstone assessment tool. A second section was added to assess for recliner sleeping behavior. The final 2-part assessment is referred to as the D-12 with modifications, or mD-12. While the terminology “modifications” and “modified” is utilized here, it is important understand that the validated D-12 instrument itself was not modified in any way. The two-part mD-12 was formatted for use as a clinical template, and was envisioned as being embedded into the EHR for efficiency and ease of use by the nurses (see Appendix C).

Anticipated results of the capstone included improved nurse self-efficacy related to dyspnea assessment, as well as quantitative and qualitative nurse satisfaction with the mD-12 instrument, and improved assessment of chronic dyspnea in community-dwelling older adults. Secondary outcomes that were considered, but were beyond the scope of the

capstone intervention were: potentially fewer emergency department episodes and inpatient admissions for respiratory exacerbations and associated reduction in healthcare costs, improved nursing articulation, documentation, and clinical decision-making related to chronic dyspnea, and improved management of patients with chronic dyspnea.

Data Analysis and Interpretation

Sampling and Data Collection

The project was initiated on January 12, 2015 with a classroom-based session for nurses in the department, a total of nine registered nurses and two certified nurse practitioners (see capstone timeline Appendix F). The main investigator conducted the session. The agenda included an explanation of the study, rights to accept or decline participation, and assurance of participant understanding prior to beginning the study. The pre-test was administered, the nurses were given a copy of the assessment template, its use was explained, and questions answered. Template use during patient visits began the day of the session and pre-test. Nurse and NP subjects were asked to assess dyspnea with the template at each nursing visit during the subsequent two months. Because the standard method of documentation for *Site* staff is to take hand-written notes while in the home, and transfer them into the computerized medical record following the visit, the subjects used a paper copy of the template during assessment of the patients, and then transferred the information into the EHR. In compliance with UND and *Site* IRBs, paper copies were given to the main investigator anonymously; the copies were counted and destroyed. After nine weeks of template use, the post-test was administered on March 16, 2015, followed by a discussion of nurse subjects' opinion of the template and implications for practice.

Analysis

The *Site* Program Director provided the main investigator with a report of the total number of patient visits, rate of associated template usage, and in-patient admission count with diagnosis. The template completion and visit reports were provided as a list of RN or NP subjects. Therefore, it was possible to perform separate analyses of the RN and NP groups. The results of the pre-test and post-test self-efficacy Likert-type questions (1 through 6) were each examined for trend identification and statistical analysis; remaining qualitative queries were compiled and analyzed.

Template Use and Completion

Nine RNs and one NP completed the study. Nine RNs and 2NPs took the pretest. The second NP had zero template utilization, opted out of the post-test, and was therefore excluded from the data analysis as a non-participant. During the nine-week data collection period, the *participating* RN/NP group conducted a total of 368 visits, ranging from an individual subject low completion of 1 visit to an individual subject high completion of 59 visits. The template completion mean was 43.91%, standard deviation 31.58%, and range was 0.0% to 90.2% of the visits for the ten participating subjects.

Lower visit utilization was directly correlated with markedly lower template completion in three subjects (see Appendix G, Tables G1 and G2). There was no significant change in acute care admission rate related to cardiorespiratory diagnoses (33.3% versus 30.1% respectively) for the study period compared with calendar year 2014 (see Appendix G, Table G3). In spite of the small sample size ($n = 10$), the Shapiro-Wilk test confirmed that the data are normally distributed ($p > .05$; see Appendix H for statistical analyses)

Self-Efficacy Pre-Test/Post-Test Comparison

The purpose of the first six questions on the pre-test and post-test (SE-6) was to measure the change in nurse self-efficacy with respect to: assessing dyspnea in general, in familiar and unfamiliar patients, making sound clinical decisions about, accurately documenting, and articulating changes related to dyspnea. For consistency, the SE-6 questions on the pre-test were exactly duplicated on the post-test. Each was a 5-point Likert-style question, where nurses' choice of responses ranged from "Strongly Agree" (quantitatively, "5") to "Strongly Disagree" (quantitatively, "1"). The distribution of responses is displayed in Appendix G, Table G4.

Participant responses for the SE-6 were dichotomized into either "Strongly Agree" (SA) or "not Strongly Agree" (n-SA) with an *a priori* prediction that the number of post-test "Strongly Agree" responses out of all 300 possible responses for that test would be greater than all 300 possible responses of the pre-test. A chi-Square Test-of-Independence analysis was performed to determine association between SA (higher efficacy) and n-SA (lower efficacy) before and after the period of patient assessment with the mD-12 template (intervention). All expected cell frequencies were greater than five. There was a statistically significant association between an increase in self-efficacy related to dyspnea assessment as measured by SA responses and n-SA by nurses before and after using the mD-12 instrument for patient assessment, $\chi^2(1) = 7.054$ ($p = .008$; See Appendix H; Tables H1 through H12). There was a small association (effect size) between improved self-efficacy and template use, $\phi = 0.108$, ($p = .008$). That is, nurses were 7.4 times more likely to respond "Strongly Agree" after the intervention than before.

Qualitative Data

The capstone pre-test questions 7 through 10 and post-test questions 13 through 19 gathered qualitative responses related to dyspnea assessment and template use. No formalized method was applied for analysis. Subject responses are listed verbatim for the pre and post-tests in Appendices I and J, respectively, and summarized as follows:

- Use the mD-12 with associated diagnoses, in patients with existing chronic dyspnea, or with initial or quarterly assessments. It is not appropriate for universal use.
- Shorten or simplify the tool; revise the scale to account for at rest versus with activity; revise “none, mild, moderate, or severe” to “never, rarely, sometimes, or frequently”.
- The Questionnaire is helpful to encourage patient discussion, better identify degree of dyspnea and emphasize the importance of assessing for sleeping posture.
- Nurses generally valued having a more thorough set of queries to intensify patient assessment and reported that chronically dyspneic patients also appreciated the approach and questionnaire. Some patients not dyspneic were frustrated/impatient with the assessment.
- Nurses who would choose to use the tool in the future were mixed:
 - No (n = 3) – “can assess without it, too difficult for the patient or want to qualify answers/tell stories, did not learn anything new.”
 - Yes (n =4) – “helpful in ‘pulling’ answers from patients; one subject wrote, “Yes: I learned more about dyspnea in my patients. I didn’t know how short of breath some of them really are.”

- Yes, with changes (n = 3) – “only with patients who actually have dyspnea... would modify, and use for initial assessment and change in condition.”
- Nurses cited a majority of the dyspnea assessment elements that are included in the Clinical Practice Guideline (RNAO, 2010), implying that they were well-educated and well-informed clinicians prior to the pre-test and information session.

Summary Discussion and Interpretation

Nine RNs and one NP completed the study, with a total **RN** mD-12 template usage of 59.06% (189/320 visits); **NP** usage was low at 16.67% (8/48) of participating NP visits during the study period. Overall total RN/NP mD-12 template usage was 53.53% (197/368 visits). There was no demonstrated change in acute admission for cardiorespiratory diagnoses during the study period, compared with the previous year. In spite of its limitations of small sample size and low powered design, this capstone has demonstrated improved nurse self-efficacy related to mD-12 template use as measured by an increase in “Strongly Agree” in the six questions related to assessment of chronic dyspnea, and a statistically significant change in chi-square test-of-independence ($p = .008$; effect size $\phi = 0.108$) for the study group. Nurse satisfaction with the mD-12 and embedded template appeared to correlate in both positive and negative directions with targeted patient status. That is, nurses deemed the mD-12 satisfactory if the patient being assessed had chronic dyspnea or a known cardiorespiratory diagnosis, and less helpful/useful when used indiscriminately or universally to assess all patients.

Strengths and Limitations

Threats to Internal Validity

Notable threats to internal validity in this capstone were attrition, maturation, diffusion (Kirchhoff, 2009, pp. 122-127), and testing (Pollit & Beck, 2012, p. 246).

- **Attrition:** There was substantial attrition during the study period. Participation of the two NPs was negligible. NP “A” made 42 visits during the study period, did not assess with the template at any of the visits or take the post-test, and was therefore excluded from the total participation count. NP “B” completed pre and post-tests, completed 8/48 visits, but was retained in the total sample. The total study visit number prior to exclusion of NP “A” was 410, and after exclusion was 368. Therefore, NP template completion was 8/368 or 2.17% (versus 8/410 [1.95%] counting all visits during the data collection period).
- **Maturation:** As the data collection period progressed, some subjects’ template completion became inconsistent. Post-study, subjects commented that there was greater willingness to use the mD-12 with patients who had dyspnea, but considered its use with every patient inappropriate. While this element led to lower visit assessment completion, it may also be an empirical indicator of growing self-efficacy: Were nurses making an independent clinical judgment of whether or not to assess with the mD-12 based on patient diagnosis, status, and experience with the tool?
- **Diffusion** – Interaction among subjects was noted to occur informally throughout the data collection period, and may have affected responses. In spite of requesting that the nurses not discuss the study with each other until completion of the data collection period, the small staff size, nature of office setting, and interpersonal interactions

rendered this request unreasonable. However, given the capstone design, diffusion may have served serendipitously as a “vicarious experience” among nurse subjects to positively influence self-efficacy.

- **Testing** – Subject familiarity with a testing instrument or questions can enhance performance. “It has been found, particularly in studies dealing with attitudes, that the mere act of collecting data from people changes them” (Pollit & Beck, 2012 p. 246). In this study, simply attending the information session and taking the pre-test could have impacted nurse responses on the post-test.

Template Not Embedded

The less than anticipated template completion rate (original goal of 90% versus actual of 53.5%) is likely directly related to reversal of an important design element. Initial approval had been given to embed the template within the nursing note, but was reversed prior to starting data collection. Therefore, to document the assessment in the EHR, subjects were required to take several extra steps to open and load the template. A majority of the nurses endorsed this as a significant barrier related to low completion numbers because they either forgot or did not have enough time to complete the documentation. Several subjects verbalized that had the tool been embedded within the nursing note, they would have been cued to conduct the assessment more consistently.

The mixed survey response about ease of use of the template/assessment may have also been directly related to the data collection design. Had it been possible to document the assessment directly into the EHR at the time of patient visit, completion numbers and nurse satisfaction may have shown more positive results. Other negatives associated with low completion numbers were that nurses found the assessment

inappropriate for patients who did not have chronic dyspnea, patients attempted to quantify their answers based on during activity versus at rest, and subjects found the tool too long during a busy clinical day.

Limited Time Period

This capstone was limited by a short time period. Data collection took place from January through March 2015. A longer time period would allow a repeated (matched measures) design or direct patient study group design. This capstone project demonstrates the preliminary study of an important practice problem of notable clinical significance with great potential for further study.

Cognitive Impairment

Patient self-reported assessment instruments such as the D-12 and mD-12 have limited usefulness in patients with moderate to severe cognitive impairment. This is an important limitation of the capstone because the prevalence of cognitive impairment is approximately 6-10% at age 65 and increases with age (Chapman, Williams, Strine, Anda, & Moore, 2006). Therefore, alternative means of assessing breathlessness in cognitively impaired older adults will require future consideration and research.

Implications and Future Directions

The capstone has demonstrated two key findings. First, nurse self-efficacy related to chronic dyspnea assessment improved after two months' use of a validated patient self-reported questionnaire, the modified D-12. After using the mD-12, nurses in this study group were significantly more confident in assessing, documenting, articulating, and making clinical decisions about chronically dyspneic patients. Nurses verbalized partial satisfaction with the mD-12, recommending best application for initial assessments, to

assess for dyspnea-related recliner sleep behavior, and in patients with cardiorespiratory related diagnoses, but not universally. These findings are preliminary, and will require replication in larger cohorts and varied clinical settings, but are a pilot demonstration of clinical effectiveness. As such, the capstone reflects the preliminary study of an important practice problem of notable clinical significance with great potential for further study.

The mD-12 remains available as a clinical template within the *Site* EHR that RN or NP staff can access and use at any time. There is on-going discussion about the possibility of adding the questionnaire or a streamlined version to required initial and quarterly patient assessments, and for use as a telephone triage tool. *Site* staff has also recommended that caregivers be educated to use the mD-12 questions with patients.

Particular future research is recommended with the mD-12 in telephone triage of chronically dyspneic patients. The quantifiable elements within the mD-12 related to the physical and affective domains of dyspnea could be beneficial to clinical staff attempting to make a decision about the urgency of changes in patient condition. An acute escalation in the mD-12 score could help guide medication management, need for emergent versus non-emergent services, and patient education. Given that older adults often under-report or misinterpret changes, the mD-12 also has the potential for use in patient self-management, as chronically dyspneic adults (if cognitively intact) could be taught to self-administer the tool. This is also a potential opportunity for future study that could ultimately lead to clinical usefulness.

Future study using the mD-12 as a research tool to measure direct patient outcomes in larger cohorts of older adults in other healthcare settings, in patients with

specific related diagnoses, and in younger adults is recommended. Specifically, study of older adults with the mD-12 is recommended in outpatient, acute care, emergency department, cardiac and pulmonary rehabilitation, skilled nursing facility, and in palliative care and hospice. Given the dearth of existing literature, future research of recliner sleep behavior using the mD-12 is highly recommended. Further study of assessment self-efficacy in practicing nurses is also recommended. Future research could include a nurse or NP study group with repeated (matched) measures, or a direct patient study group.

Potential Cost Efficiency

If used purposefully to assess patients with cardiorespiratory conditions or symptoms, the mD-12 could potentially improve clinical care and cost efficiency in varied settings of care with elderly adults including reduced ambulatory care and nurse home visits. Improved recognition of worsening dyspnea, leading to quicker treatment of less serious exacerbations, fewer emergency episodes, fewer preventable acute care admissions and readmissions, and improved management over time could each potentially lead to significant cost avoidance. Again, the brevity and numerical scale of the tool could be easily and inexpensively adapted for use in nurse telephone triage to quantitate patient changes, and enhance the articulation, clinical decision-making, and documentation of dyspnea.

Conclusion

Bausewein, Booth, & Higginson (2008) state the following about dyspnea in advanced disease: “Regular, standardized assessment of the severity of this distressing symptom is not yet considered mandatory in clinical practice, yet without this there can

be no accurate assessment of the effectiveness of interventions and necessary changes of treatment” (p. 95). Nursing assessment of chronic dyspnea in the older adult population is clearly an important issue that calls for creative strategies and clinical improvement. An introductory session and associated use of a clinical template based on patient self-reported outcome measures was aimed at increasing nurse self-efficacy and concomitant improved practice quality. The overall purpose of this capstone was to increase dyspnea assessment-related self-efficacy in nurses caring for older adults with chronic dyspnea, to identify a tool acceptable to nurses for assessing dyspnea in clinical practice, and to improve assessment of chronic dyspnea in community-dwelling older adults.

In summary, the capstone addressed the problem of inadequate dyspnea assessment of older adults in the home care setting. The literature confirms that chronic dyspnea is a potent, independent predictor of mortality and is prevalent in older adults, yet the assessment of dyspnea is insufficient and use of validated measures is inadequate. Older adults either under-report or have poor perception of chronic dyspnea, developing strategies (such as sleep in upright postures) that self-restrict daily activities in order to improve breathing and quality of life. Gaps in care currently exist in the study setting where chronic dyspnea-related diagnoses result in 32% of inpatient admissions, but nurses do not use a validated dyspnea assessment instrument. The ATS and ACCP recommend complete assessment of dyspnea via physical and affective domains to improve early recognition of dyspnea exacerbation. Emerging evidence indicates that a short patient-reported outcome questionnaire format may be the most reliable way to measure chronic dyspnea in the clinical setting.

“People who regard themselves as highly efficacious act, think, and feel differently from those who perceive themselves as inefficacious. They produce their own future, rather than simply foretell it” (Bandura, 1985).

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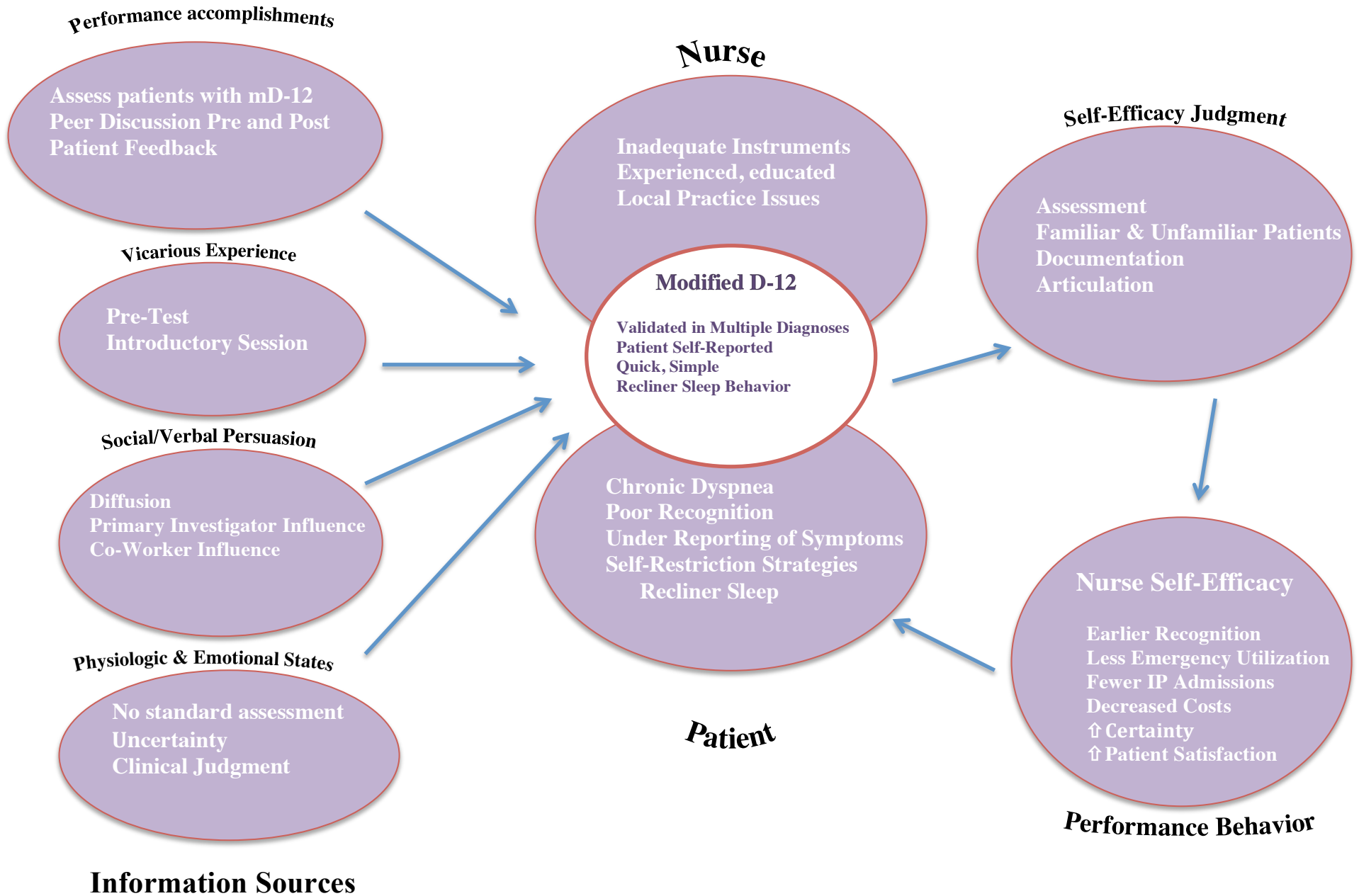
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Appendix A – Theoretical Framework



Appendix B - Dyspnea Instruments by AHRQ Classification

The literature revealed numerous, but inconsistent, means of classifying dyspnea assessment instruments. For the purposes of this review, the instrument classification outlined for an Agency for Health Research and Quality (AHRQ) Symposium on palliation of dyspnea was used. The AHRQ categories are: Intensity, Situational or Functional, Effect on Health-Related Quality of Life (HRQoL), and Qualitative Descriptors (Mularski et al., 2010).

Intensity Rating Instruments are one-dimensional scales that seek to ask the patient to assign a number or quantity to the symptom of dyspnea at a singular moment in time. Examples are the Visual Analog Scale (VAS), Borg/Modified Borg Scale, and the Numeric Rating Scale (NRS). These instruments may be sufficiently sensitive for initial management. The VAS is used in clinical and research settings to measure intensity, but has weak reliability. It is similar to the 0/10 pain scale. It is most useful for within-subjects measures. The modified Borg Scale is a 10-point scale of intensity developed to measure the rate of perceived exertion in healthy subjects, and now commonly used in COPD. It is more reproducible than VAS, is most sensitive in post-activity testing such as after pulmonary rehabilitation, but dyspnea ratings are not reproducible with physiologic indicators such as oximetry. It has usefulness for phone assessment. The NRS is also a 0-10 scale of intensity, easy for patients to use, and correlates well with the VAS. It is more repeatable than VAS (Bausewein et al., 2006).

Situational/Functional Instruments are multidimensional measures. The Medical Research Council Dyspnea Scale (MRC) is not sensitive enough to capture change after intervention, and not reliable in clinical practice. It is widely used to assess prevalence in epidemiological studies. The Oxygen Cost Diagram (OCD) is a retrospective measure of patient report of how dyspnea hinders daily activities. It correlates well with 6-minute walking test, but not pulmonary function tests. The Baseline Dyspnea Index/Transitional Dyspnea Index (BDI/TDI) is an interviewer-administered 5-category test of magnitude of task, magnitude of effort, and functional impairment. It is sensitive enough to capture acute change/COPD exacerbation and the TDI can trend changes from baseline condition.

Health Related Quality of Life (HRQoL) Instruments are complex, comprehensive, lengthy and burdensome for patients in clinical care settings, but effective for research. There is good correlation with dyspnea intensity and HRQoL measures. The Chronic Respiratory Disease Questionnaire (CRQ) is the most widely used. However, it is COPD specific and not sensitive to small condition changes. The St. George Respiratory Questionnaire (SGRQ) is an interviewer supervised, comprehensive, 76-item scale specific to asthma, COPD, and bronchiectasis that takes 15-25 minutes to complete, and is widely used in research (Bausewein et al., 2006).

Qualitative Descriptors are verbal descriptors related to dyspnea intensity such as heavy/fast breathing and work/effort, but are not specific enough to be useful in clinical practice (Mularski, 2010).

Appendix C - Modified Dyspnoea-12 Assessment (mD-12) Template

1. Nurse cannot assess due to cognitive impairment or alteration in mentation.
2. Your provider and nurses are testing a new way of asking about your breathing. These questions are designed to help us learn more about your breathing. It will take less than 5 minutes.
3. I will read each question, and then ask you to the best answer that matches your breathing “these days”. Then, I will ask you to answer each as none, mild, moderate, or severe. For example, the first statement is, “My breath does not go in all the way.” Answer none, mild, moderate, or severe. Do you have any questions? Please answer all items as best as you are able. Thank you.

Item	Score	None = 0	Mild = 1	Moderate = 2	Severe = 3	Total
1 My breath does not go in all the way						
2 My breathing requires more work						
3 I feel short of breath						
4 I have difficulty catching my breath						
5 I cannot get enough air						
6 My breathing is uncomfortable						
7 My breathing is exhausting						
8 My breathing makes me feel depressed						
9 My breathing makes me feel miserable						
10 My breathing is distressing						
11 My breathing makes me agitated						
12 My breathing is irritating						
TOTAL						

Reproduced from: Quantification of dyspnoea using descriptors: Development and initial testing of the Dyspnoea-12 by J. Yorke, S. H. Moosavi, C. Shuldham, & P. W. Jones, *Thorax*, 65(1): 21-26, 2010. With permission from BMJ Publishing Group Ltd.

4. Next, I will ask 3 questions about where you prefer to sleep and why. We want to do a better job at finding out about your most comfortable nighttime position.

Sleeping Posture/Preferences

#1 On most nights, where do you sleep?	<p>Drop-down menu</p> <ul style="list-style-type: none"> • A standard bed • A standard bed with my head elevated on: <ul style="list-style-type: none"> * Pillows * Other: • A hospital bed • A recliner chair <ul style="list-style-type: none"> * With legs elevated * With legs down • Other:
#2 On most nights, how do you sleep?	<ul style="list-style-type: none"> • Lying flat • Head elevated • Legs elevated • Other:
The reason you sleep THIS WAY IS? Nurses: please document anything/all comments the patient says here.	<p>Drop-down menu:</p> <ul style="list-style-type: none"> * I can breathe better * Other:

Appendix D - Pre-test for Dyspnea Assessment Project

1. I am confident in assessing dyspnea.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

2. I am confident that I can assess dyspnea in patients I am familiar with.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

3. I am confident that I can assess dyspnea in patients that I am not familiar with.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

4. I am confident that I can make *sound clinical decisions* related to dyspnea.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

5. I am confident that I can *accurately document* dyspnea symptoms.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

6. I am confident that I can *articulate* changes in dyspnea that indicate improvement or worsening in a patient's status.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

7. What method(s) do you use for assessing for dyspnea?

8. What challenges or barriers do you encounter when assessing for dyspnea?

9. What challenges or barriers do you encounter when documenting a dyspnea assessment?

10. What challenges do you encounter when articulating dyspnea symptoms to team members?

*Appendix E - Post-test for Dyspnea Assessment Project***1. I am confident in assessing dyspnea.**

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

2. I am confident that I can assess dyspnea in patients I am familiar with.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

3. I am confident that I can assess dyspnea in patients that I am *not* familiar with.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

4. I am confident that I can make *sound clinical decisions* related to dyspnea.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

5. I am confident that I can *accurately document* dyspnea symptoms.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

6. I am confident that I can *articulate* changes in dyspnea that indicate improvement or worsening in a patient's status.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

7. I found the *Dyspnoea-12 Questionnaire* easy to use.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

8. The *Dyspnoea-12 Questionnaire* was helpful in assessing my patients' symptoms.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

9. All questions on the *Dyspnoea-12* tool were clearly stated for my patients.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

10. The template was helpful in understanding whether the patient's sleeping preference was related to dyspnea.

Strongly agree. Agree. Neither agree nor disagree. Disagree Strongly disagree

11. Overall, the template was easy to use.

Strongly agree Agree Neither agree nor disagree Disagree Strongly disagree

12. Please estimate how often you performed assessment with the Dyspnea-12 tool *and entered it into the CPRS template*:

- about ¼ of the time (0-25% of my patient visits)
- about ½ of the time (26-50% of my patient visits)
- about ¾ of the time (51-75% of my patient visits)
- always or most of the time (76-100% of my patient visits)

13. What was *most* helpful about using the template?

14. What was *least* helpful about using the template?

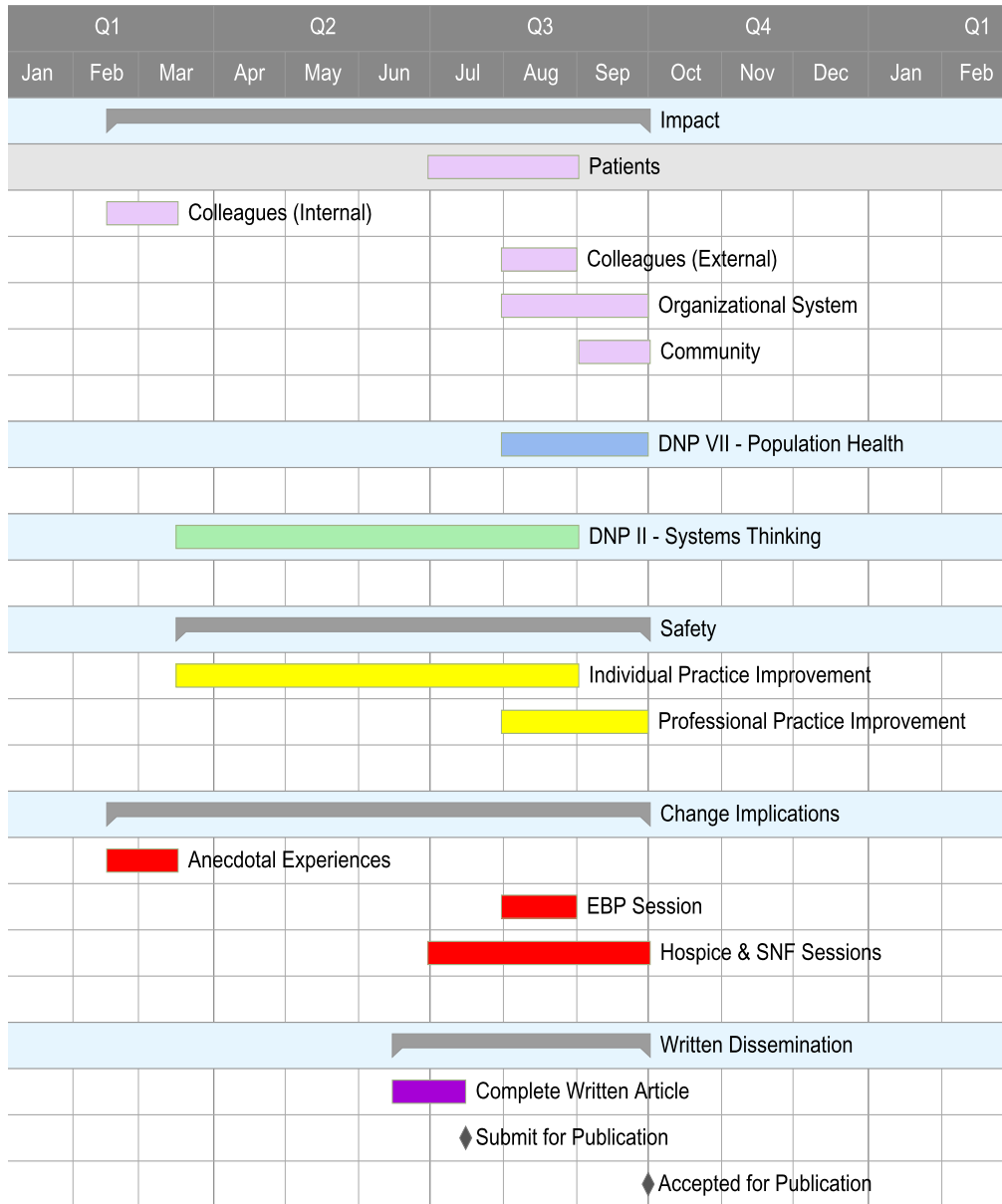
15. Would you use the template in the future? Why or Why not?

16. What changes, if any, have you made in your method(s) for assessing dyspnea as a result of using this template?

17. Please share any comments or suggestions about the template.

18. Please share any comments or suggestions about conducting an assessment of a symptom like dyspnea:

Appendix F - Capstone Dissemination Timeline in Months View



Appendix G – Capstone Data Tables

Table G1 - Template Use All Subjects			
n = 10	Completed Visits	Template	
		Used	% Use
A	49	20	40.8
B	1	0	0.0
C	59	52	88.1
D	46	22	47.8
E	25	2	8.0
F	11	3	27.3
G	45	30	66.7
H	43	23	53.5
I	41	37	90.2
J	48	8	16.7
Total	368	197	53.5

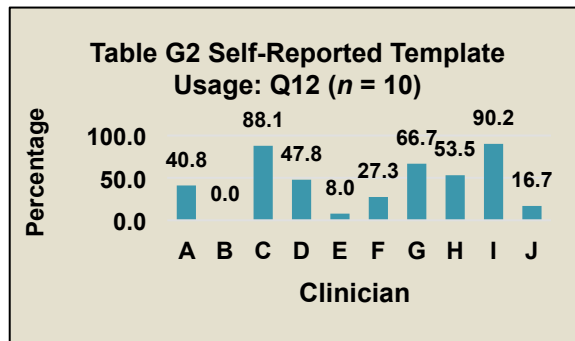
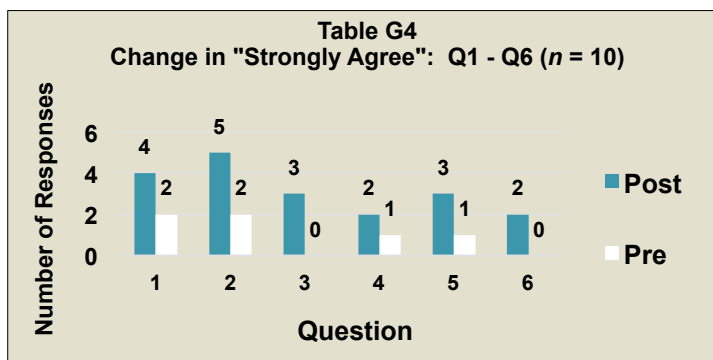


Table G3 Admissions for Cardiorespiratory Conditions*			
Data Collection Period	Admissions for C-R Conditions*		
	Total	Count	%
CY 2014	126	39	30.1
Q4 2014	39	13	33.3
01-12-15 to 03-15-15	21	7	33.3

*CHF, COPD (includes Bronchitis), Pneumonia, Pulmonary Fibrosis, Respiratory Failure and Shortness of Breath



Appendix H – Capstone Data Analysis Tables

Table H1 SA Response Crosstabulation					
			Test		Total
			Pre-Test	Post-Test	
SA Response	Strongly Agree	Count	6	19	25
		Expected Count	12.5	12.5	25.0
	Not Strongly Agree	Count	294	281	575
		Expected Count	287.5	287.5	575.0
Total	Count	300	300	600	
	Expected Count	300.0	300.0	600.0	

Table H2 chi-Square Test-of-Independence					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.054 ^a	1	.008		
Continuity Correction	6.010	1	.014		
Likelihood Ratio	7.397	1	.007		
Fisher's Exact Test				.013	.006
Linear-by-Linear Association	7.042	1	.008		
N of Valid Cases	600				
a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.50.					
b. Computed only for a 2x2 table					

Table H3 Tests of Normality							
Test		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Strongly Agree = 5	Pre-Test	.202	6	.200 [*]	.853	6	.167
	Post-Test	.223	6	.200 [*]	.908	6	.421
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Table H4 Group Statistics					
Test		N	Mean	Std. Deviation	Std. Error Mean
Computed	Pre-Test	6	5.00	4.472	1.826
	Post-Test	6	15.83	5.845	2.386

Table H5 Group Statistics					
	Test	N	Mean	Std. Deviation	Std. Error Mean
Strongly Agree = 5	Pre-Test	6	1.00	.894	.365
	Post-Test	6	3.17	1.169	.477

Table H6 Correlations			
Descriptive Statistics			
	Mean	Std. Deviation	N
Post-Strongly Agree = 5	3.17	1.169	6
Pre-Strongly Agree = 5	1.00	.894	6

Table H7 Correlations			
		Post-Strongly Agree = 5	Pre-Strongly Agree = 5
Post-Strongly Agree = 5	Pearson Correlation	1	.765
	Sig. (2-tailed)		.076
	N	6	6
Pre-Strongly Agree = 5	Pearson Correlation	.765	1
	Sig. (2-tailed)	.076	
	N	6	6

Table H8 Nonparametric Correlations				
			Post-Strongly Agree = 5	Pre-Strongly Agree = 5
Kendall's tau_b	Post-Strongly Agree = 5	Correlation Coefficient	1.000	.641
		Sig. (2-tailed)		.101
		N	6	6
	Pre-Strongly Agree = 5	Correlation Coefficient	.641	1.000
		Sig. (2-tailed)	.101	
		N	6	6
Spearman's rho	Post-Strongly Agree = 5	Correlation Coefficient	1.000	.739
		Sig. (2-tailed)		.094
		N	6	6
	Pre-Strongly Agree = 5	Correlation Coefficient	.739	1.000
		Sig. (2-tailed)	.094	
		N	6	6

Table H9 Symmetric Measures			
		Value	Approx. Sig.
Nominal by Nominal	Phi	-.108	.008
	Cramer's V	.108	.008
N of Valid Cases		600	

Table H10 Mann-Whitney Test	
Test Statistics ^a	
	Strongly Agree = 5
Mann-Whitney U	2.000
Wilcoxon W	23.000
Z	-2.622
Asymp. Sig. (2-tailed)	.009
Exact Sig. [2*(1-tailed Sig.)]	.009 ^b
a. Grouping Variable: Test	
b. Not corrected for ties.	

Table H11 Independent Samples Test											
		Levene's Test for Equality of Variances				t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Computed	Equal variances assumed	.432	.526	-3.606	10	.005	-10.833	3.005	-17.528	-4.139	
	Equal variances not assumed			-3.606	9.360	.005	-10.833	3.005	-17.591	-4.076	

Table H12 Independent Samples Test											
		Levene's Test for Equality of Variances				t-test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
Strongly Agree = 5	Equal variances assumed	.432	.526	-3.606	10	.005	-2.167	.601	-3.506	-.828	
	Equal variances not assumed			-3.606	9.360	.005	-2.167	.601	-3.518	-.815	

Appendix I - Pre-Test Qualitative Data

QUALITATIVE			
Q7	Q8	Q9	Q10
Method(s) for assessing dyspnea	Challenges or barriers assessing dyspnea	Challenges or barriers documenting dyspnea	Challenges or barriers articulating dyspnea
Observation, auscultation (with scope and "naked ears"), interview/verbal report by patient	Patient's perception of dyspnea; patient's verbalization of their normal.	?	Team members on a "different page"-- We're not using a standardized tool.
Visual assessment, lung assessment. Questioning SOB with activity or just sitting. Ask if they sleep elevated. Use of inhalers	Patients will deny SOB but then admit that they can't breathe lying down.	Need to ask more questions than "Do you have any SOB?"	Can't think of any.
Auscultation of lung sounds, respiratory rate, O2 sats, SOB w/activity. Above w/ambulation	Sometimes difficulty w/positioning in home or cooperation of patient (dementia).	Sometimes unsure of specific terminology: i.e. different types of lung sounds	Same as #9
VS; oxygen monitor; history and current conditions	Redo sats	History of smoking; vocabulary related to lung sounds	Common vocabulary
Assess respiratory rate, work of breathing, or verbal response from patient.	Patient has difficulty describing- frequently respond with "sometimes" or "kind-of"	No clear descriptors or guidelines. How do I know when an intervention is appropriate? There is no clear way to assess time frame - is this new? How long?	It is unclear when to note changes. Is this information communicated only when the patient requires an intervention? When is this felt to be pertinent? When there is a change from patient's baseline?

<p>Patients' report of dyspnea at rest or w/activity; respiratory rate, oxygen saturation, use of accessory muscles, ability to converse</p>	<p>May not be familiar with patient's baseline. Patients do not always recognize changes in dyspnea or are reluctant to report changes.</p>	<p>Consistency with providers and standards and quality of documentation. No consistent parameters.</p>	<p>Knowing that the definition of terms used means the same thing.</p>
<p>Color, nails, activity tolerance, talking, listening, looking, weight, when do they feel relief--meds, positional, stressors</p>	<p>Patient denial; What's normal for patient.</p>	<p>Unsure at this time. I chart what I have assessed.</p>	<p>I know, but do have problems articulating...finding the right words sometimes.</p>
<p>I ask patient about specific activities and positional changes. I ask what makes it worse, or better.</p>	<p>I think some patients aren't always forthcoming and/or become comfortable with their baseline. Sometimes the patient has cognitive difficulties such as memory issues.</p>	<p>Sometimes documentation can be too lengthy and time consuming.</p>	<p>I can't think of any at the present moment.</p>
<p>Resp rate, O2 sat, LPM oxygen up/down or same rate, WOB, patient self-report, CG report, sleep in chair due to SOB or not</p>	<p>Some patients are not excellent historians or reporters of dyspnea; dementia</p>	<p>Many patients' dementia prevents accurate understanding and documentation</p>	<p>Giving objective findings ok, but giving & reporting subjective findings is difficult.</p>
<p>Increased respirations, labored breathing, chest retractions, exhaustion</p>	<p>Time during visit. Treatment management</p>	<p>Documentation sometimes doesn't match person's level of dyspnea.</p>	<p>Level of severity of dyspnea</p>

Appendix J - Post-Test Qualitative Data

QUALITATIVE					
Q13	Q14	Q15	Q16	Q17	Q18
Most helpful ab/using the template	Least helpful ab/using the template	Use in the future? Why or why not?	What changes have you made in assessing dyspnea after using the template	Comments or suggestions about the template	Comments or suggestions about conducting an assessment of a symptom like dyspnea
#2 is helpful	#1 is least helpful	I think I can assess the patient for dyspnea w/o the template. It's too detailed and the patient I assessed didn't want to answer with a number, rather he wanted to answer in the narrative.	None	Too much documentation. Need specifics about total scores and interventions for those score ranges.	Shorten the assessment and documentation. (I only had an opportunity for ONE patient.)
Easy, quick access via CPRS	Drop-down to highlight 0-3 would've been quicker/easier	No-difficult for patient to answer w/o stories or qualifications of answers	Better idea of what/how to ask dyspnea questions	Patients had difficulty rating 0-3. Always wanted to qualify answers, i.e. with or w/o exercise or pain	No response
Allowed/encouraged discussion with patient that may not have happened before.	Some patients had difficulty understanding the questions.	Yes, but would modify and make a few changes.	I address dyspnea more openly and ask for further clarification.	Overall, I thought it was helpful, and hopefully identified patients who have been saying "no" to SOB in the past.	Important for nurses to ask the patient more questions than just "Are you SOB-yes or no." Emphasized the importance of sleeping in bed, pillows, and effect on overall breathing. Therefore, important questions for nurses to ask.
The questions about why they sleep elevated or not	The grading of the answers	No, I did not learn anything new that I didn't already know about my patients.	If they sleep in a regular bed and elevated whether it is for breathing or just for comfort - muscle vs. GERD	I disliked the none-mild-moderate-severe. Felt it should have been worded never-rarely-sometimes-frequently	See # 17.

Getting patients/vets to think more "critically" about their breathing.	The statement "these days" does this mean in the last 2-3 days? Last week? Last month? Since I assessed you last? It wasn't clear to me if the statements pertained to the veteran "at rest" vs. "w/activity".	Portions - Like statement #2, 5, 6, 7, 8	More specific questions / statements	"Tell the patient we are testing a new way of asking "our veterans" about their breathing. I'm going to read a <u>statement</u> and ask you to respond if that is true for you - if it is true - then is it mildly, moderately, or completely/severely true. Have 2 columns to score--one for at rest, one for w/exertion.	The vets with respiratory difficulties seem to appreciate the concern shown w/a questionnaire such as this. The vets (some) who don't have respiratory difficulties were frustrated/aggravated w/the questionnaire.
Very easy to use	Nothing	Yes: I learned more about dyspnea in my patients. I didn't know how short of breath some of them really are.	Check more frequently to see if sleeping has changed. Some patients had changed from bed to recliner or increased HOB and I was not aware.	Easy to use. Maybe make it clearer for the patients.	It was interesting and helpful.
The first few questions	Too confusing questions for patients	Yes, but only with patients who actually have dyspnea.	Able to get more detail.	No response	No response
Full assessment on pulmonary	Nothing	Yes	Ask same questions but in an easier way to start. I always struggled with the starting part because it felt backward.	No response	No response
The template	No response	Yes: helpful pulling answers from the vets	Any increase in dyspnea	No response	No response
It is helpful with a patient you are not familiar with to get a better understanding of their dyspnea.	Patients had difficulty differentiating between the descriptors. They felt like they were asking the same thing.	Yes, I think it is helpful for the initial assessment and in recognizing a change in dyspnea.	It provided me with several different descriptors that patients may identify with better in terms of their dyspnea.	No response	No response

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