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by

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ABSTRACT

OBESITY, DYSPNEA ON EXERTION AND

HEALTH RELATED QUALITY

OF LIFE IN OBESE

MALES

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Previous research has shown that one in three otherwise healthy obese adults experience dyspnea on exertion (DOE). Both dyspnea and obesity can have a negative influence on a person's health related quality of life (HRQOL). However, it is unclear if these relationships can be found in otherwise healthy mild-to-moderately obese men. In this study, we examined the relationship between 1) obesity and HRQOL, and 2) dyspnea on exertion (DOE) and HRQOL.

A secondary analysis was conducted from the baseline data of an interventional 12-week weight loss study. Volunteers filled out the Medical Outcomes Short Form-36 (SF-36) as the measurement for HRQOL. The SF-36 consists of eight domains that measure: physical functioning, role limitations due to physical problems, bodily pain, general health

perceptions, vitality, social functioning, role limitations due to emotional problems, and emotional well-being. Each domain has a score of 0-100, where the highest scores indicate a better HRQOL. Obesity was determined from measurement percent body fat obtained by underwater weighing or DEXA scan and BMI. BMI had to be between 30-50 kg/m^2 during screening and percent body fat had to be $\geq$ 30% but $\leq$ 50% to be included in the study. Lastly, during a six-minute submaximal constant load exercise cycling test at 105 watts, participants provided ratings of perceived breathlessness (RPB; Borg Scale 0-10) as a measure of DOE (rating at min six of exercise).

Forty-one men (age: 34 $\pm$ 6 yr, BMI: 36 $\pm$ 5 kg/m^2, percent body fat: 38 $\pm$ 5 %) participated. The mean RPB during minute six of the exercise was three (SD= 1.63). The strongest negative correlations were between percent body fat and social functioning (r= -0.530, p= 0.000), BMI and physical functioning (r = -0.423, p= 0.006), and RPB and physical functioning (r= -0.379, p= 0.015).

Our findings support that there is a negative impact on domains of an individual 's HRQOL. In specific, we found that there is a reduced physical functioning when an individual has an increase in BMI and DOE. In addition, social functioning is reduced when an individual has an increase in percent body fat. Therefore, reduced physical and social functioning may lead to reduced physical activity levels, which ultimately may increase weight gain and continue worsening HRQOL. Therefore, clinicians should consider these findings when treating obese individuals and offer treatments to reduce weight and DOE as well as offer coping mechanisms that will aid this population to improve quality of life.

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CHAPTER 1

INTRODUCTION

In the United States, more than one-third of adults are considered to be obese (BMI $\geq$30 kg/m^2) (Center for Disease Control and Prevention, 2016b). Previous research has shown that up to 80% of obese adult's experience dyspnea (shortness of breath) on exertion (Sin et al., 2002). Exercise is known to prevent obesity, but the common belief is some adults may not exercise because of the unpleasant experience of feeling dyspneic. Obese individuals, and those with dyspnea, experience an impaired health related quality of life (Jia, Lubetkin, 2005). Health related quality of life (HRQOL) is defined by the Center for Disease Control and Prevention (CDC) as the physical and mental health perceptions of an individual (2016a).

1.1 Significance

Those with obesity are at an increased risk to experience dyspnea on exertion and less likely to participate in exercise. In one study, it was found those with obesity were two and a half times more likely than those with a normal body mass index (BMI) to experience dyspnea while walking up a hill (Sin et al., 2002). The individuals with obesity were also less likely to walk or jog than those with a normal body weight (Sin et al., 2002). Obesity is linked to other conditions such as stroke, certain types of cancer, heart disease, and type 2 diabetes (CDC, 2016b). Obesity is not only linked to poorer health outcomes in individuals, but also comes at an increased cost. In 2008, it was estimated that the annual medical cost of obesity was $147 billion (CDC, 2016b). Exercise can control weigh reduce

the risk of cardiovascular disease, type II DM, metabolic syndrome, and certain cancers, and improve mental health and mood (CDC,2015). Those with obesity are less likely to participate in exercise and have an increased risk for developing preventable diseases. Health related quality of life is a way to measure the well-being of individuals and the effects that chronic diseases, disabilities, and treatments have on their HRQOL (Healthy People 2020, 2017). Measuring HRQOL can determine the effectiveness of treatment plans to improve HRQOL (CDC, 2016b). Health related quality of life is measured by patient reported outcomes allowing clinicians to better understand how a patient is feeling. It is beneficial for health care providers to be aware of the effects that obesity and dyspnea can have on an individual's HRQOL so that they can create interventions to improve HRQOL.

1.2 Definitions of Major Concepts

1.2.1 Dyspnea

Dyspnea is a subjective symptom that is defined as an uncomfortable awareness of breathing and is often described as shortness of breath. (Bass, 1990). It can cause the feeling of the inability to take a deep breath or the feeling of tightness in the chest (Bass, 1990).

1.2.2 Obesity

Obesity is a medical condition when body mass index (BMI) is 30 kg/m^2 or above (Center for Disease Control and Prevention, 2016b). According to the CDC website, those with a BMI between 30-39.99 kg/m^2 are considered to be obese, while those with a BMI of 40 and above are considered to be extremely obese (CDC, 2016b). BMI is not able to determine the amount of body fat an individual has (CDC, 2016b). Percent body fat is another way to measure obesity. According to the American College of Sports Medicine, for men aged 20-29 years old a percent body fat of 19.7 is considered poor, 30-39 years

old a percent body fat of 22.4 is considered poor, and for 40-49 year olds a percent body fat of 24.2 is considered poor (Kaminsky, 2014). In general, a range of ten to twenty percent body fat is considered satisfactory for health for men (Kaminsky, 2014).

1.2.3 Health Related Quality of Life

Health related quality of life measures how health status effects different aspects of a person quality of life. It examines different domains including physical, mental, emotional, and social functioning (Healthy People 2020, 2017).

CHAPTER 2

REVIEW OF LITERATURE

Research has shown populations who experience dyspnea have an impaired quality of life. The following paragraphs will discuss the known literature regarding three populations that experience an impaired quality of life. Two of the populations are those who experience dyspnea, (i.e., chronic obstruction pulmonary disease (COPD) and pulmonary hypertension (PAH) and how dyspnea affects their quality of life (Hu & Meek, 2005; Bentsen, Rokne & Wahl, 2012; Bentsen, Rokne & Wahl, 2012; Talwarm Sahni, Kim, Verma, & Kohn, 2015; Matura, McDonough, & Carroll, 2014). The third population discussed will be those with obesity and the effect this has on their HRQOL.

Patients who suffer from chronic obstructive pulmonary disease (COPD) experience dyspnea and limitation in physical functioning (Hu & Meek, 2005). Hu & Meek (2005) examined how the symptom of breathlessness in COPD patients affected HRQOL measured by the Medical Outcomes Short Form (SF-36). The effect of breathlessness was evaluated on the mental health component and the physical health component of the SF-36. The sensation of breathlessness had a negative impact on the mental and physical health component of the SF-36 (Hu & Meek, 2005). A different study compared the HRQOL of COPD patients with the general population. Those with COPD had lower scores on all eight domains and the two component scores of the SF-36 (Bentsen et al., 2012). When compared with the general population who suffered from other chronic health conditions those, living with COPD had lower scores on all parts of the SF-36 except for body pain

(Bentsen et al., 2012). This study staged COPD patients based on the Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease. It was reported that the higher the stage of COPD, the lower the HRQOL (Bentsen et al., 2012).

Another patient population that experience dyspnea are patients with pulmonary arterial hypertension (PAH). One study examined the relationship between dyspnea and HRQOL in patients with PAH. As the rate of perceived dyspnea increased in the participants, the HRQOL scores decreased in both the physical and mental health component scores of the SF-36 (Talwarm et al., 2015). It was also found that as the perceived level of dyspnea increased, the depression scores based on the Zung depression scale increased (Talwarm et al., 2015). Similarly, a different study reported those with PAH had a lower HRQOL in the domains of general health, physical functioning, role limitations due to physical problems, and vitality (Matura et al., 2014).

Overweight and obese individuals experience an impaired HRQOL. Wang, Sereika, Styn, and Berk (2013) investigated how different factors correlate with HRQOL in overweight and obese individuals. The factors that they focused on were personal and family health history, lifestyle, socio-economic and demographic characteristics, and psychosocial aspects (Wang et al., 2013). Individuals with higher BMI's had lower scores on the areas of the physical component and physical functioning of the SF-36. They also found those who had the perception of less stress and social problem-solving skills had a higher HRQOL on all domains and components of the SF-36 (Wang et al., 2013). Jia and Lubetkin (2013), examined HRQOL in obese individuals in the United States, specifically focusing on individuals not diagnosed with chronic conditions commonly associated with

obesity. These conditions were diabetes, asthma, hypertension, emphysema, stroke, and heart disease. The results of this study were that obese individuals had a lower HRQOL, even in the absence of a diagnosed chronic condition (Jia & Lubetkin, 2013). They also reported there was a positive impact on HRQOL when participants engaged in moderate or vigorous exercise at least three times a week (Jia & Lubetkin, 2013).

There are several studies that have examined how exercise can affect in individuals HRQOL. For example, one study had participants in three different groups; high intensity training, moderate intensity training, and no training. High intensity training consisted of exercising for one hour three times a week. Participants were recommended to reach greater than ninety percent of their maximum heart rate. Those in the low intensity training program participated in supervised exercise three times a week for thirty minutes. They also were encouraged to exercise three more times a week on their own. It was recommended that they reach 40-55% of their maximal heart rate (Svensson et al., 2017). Participants followed these exercise regimens for sixteen weeks. It was discovered that high intensity had the greatest impact on HRQOL, specifically on the physical component score, physical functioning, and general health domain when compared with the control group of no exercise (Svensson et al., 2017). Vitality had a greater increase in the high-intensity exercise group than the moderate-intensity group. There was not a significant correlation in HRQOL with changes in weight or aerobic capacity (Svensson et al., 2017). Another study examined how diet, exercise, and psychological support affected HRQOL in overweight and non-morbid obese adults (Arrebola et al., 2011). The interventions were in place for six months. At the end of the six months, there were significant improvements in the physical functioning, role limitations due to physical problems, general health,

vitality and social functioning domains of the SF-36, and the mental and physical component scores (Arrebola et al., 2011).

The studies reviewed have examined the relationship between dyspnea and obesity with HRQOL. However, research has not yet been conducted regarding what the effect of dyspnea on the HRQOL in otherwise healthy obese individuals. This study will examine the relationship between the health-related quality of life in otherwise healthy obese males age 20-45 years and the rate of perceived breathlessness (RPB) as the measure of dyspnea, during a six-minute constant load cycle test.

CHAPTER 3

METHODS

3.1 Design

This study is a non-experimental secondary data analysis of an interventional 12-week exercise research study. The interventional study was conducted in Dr. Tony Babb's laboratory at the Institute of Exercise and Environmental Medicine (IEEM) located in Dallas, Texas. The explained methods below pertain to how the data was collected for the interventional study. The data was collected in accordance with the University of Texas Southwestern Institutional Review Board (STU- 122010-108) titled "Shortness of Breath during Exertion in Obesity: Part Two" (Bernhardt & Babb, 2014b; Bernhardt & Babb 2014a; Bernhardt et al., 2015; Bernhardt et al., 2016; Marines-Price, 2015). Written informed consent was obtained on all subjects that participated in the study. The University of Texas Arlington (UTA) Institutional Review Board (IRB) was contacted prior to starting the secondary data analysis of this interventional study and the UTA IRB acknowledged the UTSW study for the secondary analysis of the data in the current study (Appendix A).

3.2 Sample

A convenience sample of healthy obese males 20-45 years of age were recruited from the Dallas- Fort Worth area. This was done by using advertisements in local newspapers, emails to employees at Texas Health Presbyterian Dallas Hospital, and an online database called CenterWatch. Those interested in participating in the study contacted the research staff via phone or email, and an initial telephone-screening

questionnaire was conducted. Inclusion criteria for the subjects included: male, age 20-45 years old, BMI range 30-45 kg/m^2, body fat 30%-50%, and ability to understand and read English. Exclusion criteria included: smoking more than five pack-year, subjects with significant diseases, and those who participate in regular conditioning exercises two or more times a week. A pack-year is defined by the National Cancer Institute as multiplying the number of cigarette packs smoked per day by the number of years the individual has smoked (National Cancer Institute, n.d.). A pack-year history was important to obtain since the long-term effects of cigarette smoking to the lungs is unknown, and this could be a confounding factor.

3.3 Sample Size

The sample size was determined based on power calculations done using G*Power 3.1.9.2 (University of Kiel, Germany). Power calculations were done to detect a moderate effect size (coefficient of determination $\rho = .05$) at .05% significance level and power $\geq$ .80. From previously published research on HRQOL in patients with chronic obstructive pulmonary disease (Bentsen et al., 2013), it was estimated that a sample size of 48 was needed.

3.4 Measures

3.4.1 Demographic and Physical Characteristics

Demographic variables and physical characteristics were collected during visit one and visit two. The demographic characteristics included age, sex, race/ethnicity (Caucasian, African American, Asian, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, Undisclosed, Hispanic and non-Hispanic). The physical characteristics variables collected were height, weight and percent body fat.

3.4.2 Height and Weight

Height was taken with the subject standing with their back to the scale, hands on their hips, after a deep inhalation. Official weight was taken before the underwater weighing while the subject was in bathing attire (shorts only, no t-shirt, no socks, no shoes).

3.4.3 Body Mass Index

BMI was calculated by using the participant's official height and weight. The information was entered in the CDC Adult BMI calculator website to determine BMI (CDC, 2015a).

3.4.4 Underwater Weighing

Underwater weighing is a technique used to determine body fat, fat mass, and lean body mass. The participant submerged themselves underwater and knelt on a large weighing scale. They were asked to exhale as much as possible and stay underwater for three to seven seconds. The participant repeated the test three times and the average of the three was used for data analysis. There is a $\pm$2.7% error for adults even when the test is performed correctly (Plowman & Smith 2013). Thirty-eight participants used underwater weighing as a measure of percent body fat and the remaining three participants underwent a dual energy x-ray absorptionmeter (DEXA) scan for determination of body composition of body fat, fat mass, and lean body mass. DEXA was used in the last three participants because the laboratory switched over to DEXA scan after confirmation of the accuracy of the DEXA scan.

3.4.5 Duel Energy X-Ray Absorptiometry (DEXA)

DEXA (GE Lunar Prodigy Advance) was used to measure body fat, fat mass, and lean body mass. It is an FDA approved bone density measurement machine. During the

procedure, the participant laid down for seven minutes while the DEXA machine scanned the entire body. Three of the participants used DEXA as a measure of percent body fat and lean muscle.

3.4.6 Medical Outcomes Study Short Form-36

The Medical Outcomes Study Short Form-36 (SF-36) is a questionnaire that examines health related quality of life (HRQOL) in individuals (RAND Health, 2017) (Appendix B).The SF-36 has two summary scores, the physical component summary (PCS) and the mental component summary (MCS). It also examines eight domains. These domains are physical functioning (PF), social function (SF), limitations in usual role activities because of physical health problems (RP), bodily pain (BP), general mental health (MH), limitations in usual role activities because of emotional problems (RE), vitality (VT) (defined as energy and fatigue), and general health perceptions (GH). (RAND Health, 2017). The physical health summary consists of the physical functioning, role limitations due to physical problems, bodily pain, and general health domains. The mental health summary consists of the vitality, social functioning, role limitations due to emotional problems, and mental health domains. This questionnaire is a valid and reliable way to assess the HRQOL in individuals (RAND Health, 2017).

3.4.7 Modified Borgs Dyspnea Scale

The modified Borgs dyspnea scale was used to determine the participants rate of perceived breathlessness (Appendix C). The scale uses a simple range of numbers and simple terminology, so it is easy for participants to use. The scale starts at 0 representing "nothing at all" and ends at 10 representing "Very, very strong (Almost max)" of

breathlessness. This scale is used for the description of subjective symptoms regarding breathlessness (Borg, 1982).

3.5 Day One

During the first visit to the laboratory, participants signed a consent form. After this the medical history questionnaire was reviewed with the research staff to ensure they did not have any of the exclusion criteria parameters. Then the participant filled out the SF-36. The questionnaire was administered in person allowing the researcher to gain rapport with the participant. Benefits to in-person administration of questionnaires include the opportunity to clarify any questions the participant may have, as well as assure that all parts of the questionnaire are answered (Edwards, 2010). The research staff followed a protocol when giving the questionnaire. The participants were given enough time to answer the questions in a quiet space with enough lighting. The staff made sure to pay attention during that time they were sitting at the same level of the subject and not standing. The subject was also reassured that there was not a wrong answer and any questions they had were answered. Measurements of height, weight, and hydrostatic weighing or DEXA was used to determine percent body fat, fat mass, and lean body mass. The DEXA scan was done after all the other testing of day one was completed. The subject traveled to Texas Health Presbyterian Hospital to complete the DEXA scan.

3.6 Day Two

During the second visit the subjects completed a six-minute submaximal constant load exercise cycling test using a seated upright on a braked cycle ergometer (Lode Corrival). Before starting the exercise test, the participants were given written instructions explaining the Modified Borg Dyspnea Scale, which is the scale that measures the rating

of perceived breathlessness (RPB) (Borg, 1982). The participants were then asked to rate their breathlessness at rest to verify that the instructions were understood. The participants sat resting on the exercise bike for three minutes prior to the exercise test to gather baseline data. The resistance was set at one-hundred and five watts for the constant cycle test. One-hundred and five watts was used because of preliminary data collected in the laboratory that demonstrated obese men at this wattage were able to get close ventilatory threshold without going over it (Babb et al., 2008; Bernhardt et al., 2014a; Bernhardt et al, 2013; DeLorey et al., 2005). During the constant load cycle test, the participants were asked to "rate their breathing" by pointing to the number on the scale, which represents their perceived level of breathlessness while exercising. Participants pointed at the number because they were wearing a mouth piece and nose clips on. After this, the number was repeated out loud by the research staff to confirm their choice. The RPB was collected every two minutes while cycling and the last value recorded during minute six was used for data analysis. Those who rated their RPB below two were in a group called negative for dyspnea on exertion (-DOE), those who rated their RPB as three were put in a group called Three, and those who rated their RPB as four or greater were in a group called positive for dyspnea on exertion (+DOE).

During this test for safety, participants were monitored for heart rate (HR), blood pressure (BP), pulse oximetry, end-tidal, and respiratory rate. The participants were monitored for 15 minutes after the exercise test before leaving. The data that was collected from the study was kept in a secure password protected database and all files were in a locked filing cabinet behind a locked door.

3.7 Data and Statistical Analysis

The Statistical Package for the Social Sciences version (SPSS) version 20 was used for data analysis. Descriptive statistics were used to analyze sample population characteristics. All data were checked for normal distribution using Shapiro-Wilk test of normality. For data that were normally distributed, parametric tests were used and for data that was not normally distributed, non-parametric tests were used. A one-way ANOVA was performed for normally distributed data to determine if there was a significant difference between the three groups (+DOE, - DOE, and Three) and the domains of the domains of the SF-36. A Kruskal-Wallis test was performed on non-parametric data to determine if there was a significant difference between the three groups with the domains of the SF-36. Mann Whitney U test was used to determine which groups had significant differences between the domains of the SF-36 scores. A Spearman's rank correlation was run to compare the relationships of RPB and domains of SF-36, BMI and domains of SF-36, and percent body fat and domains of SF-36. A p-value of .05 was set to determine statistical significance. All data will be presented as mean (M) ± standard deviation (SD).

CHAPTER 4

RESULTS

4.1 Sample Characteristics

All participants (*n*= 41) were between the ages of 20-45 *M*= 33.78, SD= 6.17. Participant's race status included 20 (48.8%) Whites, seven (17.1%) African Americans, three (7.3%) Asian and 11 (26.8%) identified as Hispanic. Height *M*= 177.42 cm SD= 7.60 cm; weight *M*=113.62 kg, SD= 18.62kg; BMI *M*= 35.99 kg/m^2, SD=4.70 kg/m^2; percent body fat *M*=37.88%, SD=4.99%, fat mass *M*=43.58kg, SD=11.49kg; lean body mass *M*= 70.22kg, SD 9.91kg. The characteristics for each of the three groups (-DOE, three, and +DOE) can be found in table 4.1.

Table 4.1: Demographic and Physical Characteristics

Variable	Mean	Standard Deviation
N=41		
Age	33.78	6.17
Height cm	177.42	7.60
Weight kg	113.62	18.62
BMI kg/m^2	35.99	4.70
Percent Body Fat	37.88	4.99
Fat Mass kg	43.58	11.49
Lean Body Mass kg	70.22	9.91

Notes: Data is presented as mean ± SD=Standard deviation

Table 4.2: Demographic and Physical Characteristics Among Groups

	-DOE		Three		+DOE	
Variable	Mean	SD	Mean	SD	Mean	SD
N	14		13		14	
Age	32.15	5.60	34.62	5.56	34.43	7.31
Height cm	180.94	8.11	177.07	5.17	174.49	8.28
Weight kg	114.80	17.01	114.76	20.29	111.39	19.48
BMI kg/m^2	34.89	2.87	36.52	5.63	36.48	5.18
Percent Body Fat	36.74	5.30	36.90	4.46	39.86	4.90
Fat Mass kg	42.59	10.66	43.13	12.77	44.93	11.73
Lean Body Mass kg	72.34	10.30	72.16	9.86	66.43	9.11

Notes: Data is presented as mean ± SD=Standard deviation

Table 4.3: Race Status among Groups

Race	-DOE	Three	+DOE
N	13	14	14
African American	2	3	2
Asian	0	1	2
Caucasian	10	5	5
Hispanic	1	5	5

4.2 Normality

Vitality, emotional well-being, general health, percent body fat, and height and weight were normally distributed. All other variables were not normally distributed.

4.3 One-way ANOVA: 8 Domains of SF-36 with –DOE, +DOE, & 3

There is an effect of the breathlessness categories (-DOE, +DOE, Three) on vitality F (2,38) = 3.66, p= .04. The vitality scores were significantly higher for –DOE (*M= 59.62, SD= 14.93)* than the Three's (*M*= 43.21, SD= 17.61). General health and emotional well-being were not significantly different between the three groups.

4.4 Kruskal Wallis & Mann Whitney U: 8 Domains of SF-36 with –DOE, +DOE, & 3

The breathlessness categories were not significantly affected by role limitations due to emotional problems H(2) = 0.68, p= .71, and social functioning H(2) = 2.13, p= .346; however, breathlessness categories were significantly affected by physical functioning H(2) = 10.54 , p=.005, pain H(2) = 6.257, p=.044, and role limitations due to physical problems H(2) = 5.28, p= .071. Mann Whitney U test with Bonferroni adjusted p-values showed that there were no significant differences between the –DOE and +DOE or the +DOE and Three in the physical functioning, pain, and role limitations due to physical problems. However, the physical functioning scores for the –DOE (*M=95.00, SD=7.36)* were significantly higher than Three's (*M=74.29, SD= 18.59),* W_s=132, *z= -3.17, p*= .002. There was not a significant difference between the pain and role limitations due to physical problems scores between –DOE and Three.

Table 4.4: Domain Scores of SF-36 Among Groups

	-DOE		Three		+DOE	
	Mean	SD	Mean	SD	Mean	SD
Variable						
N	13		14		14	
Physical Function	95.00	7.26	74.29	18.59	78.93	23.71
Role Physical	96.15	9.39	76.79	26.79	78.57	32.31
Pain	94.42	9.36	87.14	11.00	84.46	14.65
General Health	63.85	19.49	58.21	19.57	62.86	19.68
Social Functioning	91.35	13.87	83.93	20.47	79.46	22.26
Role Emotional	92.31	19.97	83.33	36.40	83.33	31.35
Vitality	59.62	14.93	43.21	17.61	56.43	17.70
Emotional Well being	78.15	10.79	72.86	13.96	75.14	16.98

Note: Data is presented as mean $\pm$ SD=Standard deviation

4.5 Relationship between RPB and the Eight Domains of SF-36

The study found that RPB and physical functioning had a weak negative correlation (r=-.38, p=.015), and RPB and pain had a weak negative correlation (r= -.34, p=.031).

4.6 Relationship Between BMI and the Eight Domains of SF-36

BMI and physical functioning had a moderate negative correlation (r=-.42, p=.006). There was a moderate negative correlation between BMI and role limitations due to emotional problems (r=-.31, p=.05).

4.7 Relationship between Percent Body Fat and the Eight Domains of SF-36

The study found that percent body fat had a moderate negative correlation between physical functioning (r=-.41, p= .009), a moderate negative correlation of role limitations

due to physical problems (r=-.39, p=.012), and a strong negative correlation of social functioning (r=-.53, p=.000).

Table 4.5: Correlation of Domains of SF-36, RPB, BMI, and Percent Body Fat

SF-36 Domains	Mean	SD	RPB	BMI	Percent Body Fat
Physical Function	82.44	19.75	*r*= -.38	*r*=-.42	*r*=-.41
			**p*= .02	**p*=.01	**p*=.01
Role Physical	83.54	25.99	*r*= -.26	*r*=-.26	*r*=-.39
			p= .11	*p*=.11	**p*=.01
Pain	88.54	12.37	*r*= -.34	*r*=-.20	*r*=-.19
			**p*=.03	*p*=.21	*p*=.23
General Health	61.59	19.25	*r*= .02	*r*=-.10	*r*=-.10
			p=.87	*p*=.54	*p*=.55
Social Functioning	84.76	19.47	*r*=-.27	*r*=-.20	*r*=-.53
			p=.09	*p*=.20	**p*=.00
Role Emotional	86.18	29.79	*r*=-.14	*r*=-.31	*r*=-.24
			p=.39	**p*=.05	*p*=.14
Vitality	52.93	17.92	*r*=-.08	*r*=-.07	*r*=-.03
			p=.62	*p*=.65	*p*=.87
Emotional Well being	75.32	14.03	*r*=-.03	*r*=-.09	*r*=-.12
			p=.86	*p*=.59	*p*=.45

**p* < .0

CHAPTER 5

DISCUSSION

The purpose of this study was to examine the relationship between dyspnea, obesity, and HRQOL in otherwise healthy obese males. Obesity was measured by BMI and percent body fat. To the best of our knowledge, this is the first study to compare how the factors of obesity and dyspnea in participants are associated with HRQOL in otherwise healthy obese young men.

We found that there is an effect of breathlessness on vitality scores where the –DOE group (M=59.61) has a significantly higher vitality scores than the RPB=3 group (M=43.2), indicating that those with less breathlessness had a vitality score higher than the RPB=3 group. It was surprising to us that the +DOE group (M= 56.43) (RPB $\geq$ 4) had a higher vitality score than the RPB=3 group and these findings were not significant. Our hypothesis was that the more breathlessness an individual would experience, the vitality score would have been lower. However, our results disputed our hypothesis.

Similarly, the –DOE group had a significantly higher physical functioning scores (*M=95.00)* than the RPB=3 group (*M=74.29),* but when the RPB=3 group is compared to the +DOE group, the physical functioning scores (M=78.93) were slightly higher than the RPB=3 group. Our hypothesis was the same as previously stated: the more breathlessness the participant had the lower physical functioning scores would have been, but again, the results disputed our hypothesis.

Therefore, our interpretation of these two previous findings is that breathlessness is a complex symptom and it is difficulty to study. Perhaps these results might have been different if the sample was larger or another quality of life questionnaire that is specific for individuals that suffer from breathlessness was utilized rather than a general quality of life questionnaire. Therefore, we cannot be confident in our results.

Our results further strengthen the literature that the feeling of dyspnea and obesity in healthy obese males have a negative impact on certain domains of an individual's HRQOL (Hu & Meek, 2005; Bentsen, Rokne & Wahl, 2012; Bentsen, Rokne & Wahl, 2012; Talwarm Sahni, Kim, Verma, & Kohn, 2015; Matura, McDonough, & Carroll, 2014). When looking at how BMI impacted HRQOL, there was a negative correlation between physical functioning and role limitations due to emotional problems. Similar to our results, Wang et a., (2013) also found that those with a higher BMI had lower scores on physical functioning. Our study was unique in the fact that it examined the relationship between percent body fat and HRQOL. The percent body fat had a negative relationship with the physical function, role limitations due to physical problems, and social functioning. Percent body fat had a strong negative association with social functioning, while BMI did not have a statistically significantly relationship. Our results indicate that RPB, and physical functioning and RPB and pain have a negative correlation. This is similar to previous research, which reports that dyspnea is negatively impacts physical functioning (Bentsen et al., 2012).

Nursing professionals will encounter a large number of obese patients and patients who experience the symptom of dyspnea. The findings of this study could help nurses recognize that the most affected domains of HRQOL were physical functioning, pain,

social functioning, and role limitations due to emotional problems and role limitations due to physical problems when examining these three variables. It is critical for nurses to create interventions that will improve the HRQOL of their patients who are suffering from obesity and dyspnea. Some interventions that may be helpful are ones that will promote coping mechanisms because those with less stress have a higher HROQOL (Wang et al., 2013). Another intervention nurses can suggest to patients is to participate in exercise. Participating in moderate exercise three times per week can increase an individual's HRQOL (Jia & Lubetkin, 2013). Thus, researches should continue to explore interventions that improve HRQOL in these patients.

5.1 Limitations

One limitation in this study was the use of a convenience sampling. Another limitation is responder bias. There is no way to know if the participants responded to the questionnaires honestly. The SF-36 and RPB, which were two major components of the study, were dependent on participant's responses. When looking at the data, there was little variability in RPB, which makes it difficult to draw conclusions between the three groups. Other limitations include that I was not present for the data collection because this was a secondary data analysis and the study was near conclusion when I started my project. I also had a limited time in the lab to complete the research.

5.2 Conclusion

Dyspnea and obesity have a negative association with certain domains of an individual's HRQOL. This study has shown that the strongest negative relationship between RPB and the SF-36 was physical function. The strongest negative relationship between BMI and the SF-36 was physical functioning. Lastly, the strongest negative

relationship between percent body fat and the SF-36 was social functioning. This study showed that there was an effect on breathlessness categories for physical functioning and vitality where the Three's had lower scores than –DOE. This study indicates that both physical and mental aspects of an individual's HRQOL are negatively affected by obesity and dyspnea. Although the study did indicate statistically significant results, the factors of obesity of dyspnea could only account for ten to twenty five percent of why the individual had a reduced HRQOL. Further research should be done to understand other factors that are creating an impaired HRQOL for these individuals. Health related quality of life is a unique way to understand a patient's feeling regarding their health. It is important for educators to inform students on the benefits of utilizing HRQOL in measuring effects of disease, as well as if interventions are improving HRQOL. The bedside nurse should pay close attention to patients who suffer from obesity and dyspnea and realize that their HRQOL may be diminished. The nurse can teach the patient coping mechanisms to help with living with these conditions. This research further supports that those with dyspnea and obesity suffer from diminished HRQOL.

APPENDIX A

UTA IRB SPECIALIST LETTER

RE: Project

Stearns, Alyson G <astearns@uta.edu>

Mon 11/14/2016 11:14 AM

To:Crane, Lauren Carolyn-Marie <lauren.crane@mavs.uta.edu>; Behan, Deborah F <dgreen@uta.edu>; Lybrand, Mary Colette <marycolette.lybrand@uta.edu>;

Cc:Lybrand, Mary Colette <marycolette.lybrand@uta.edu>;

Hi Lauren,

If UTSW is providing you with a dataset that is completely de-identified, meaning that you cannot reasonably ascertain the identities of any individual participants based upon this dataset even if the data pieces are combined together, then your study would not fit the definition of "research with human subjects" requiring IRB review. Therefore, you do not need to go through the IRB for your project. Please see this decision chart from where we have made this determination: http://www.hhs.gov/ohrp/regulations-and-policy/decision-charts/#c1

However, you are still responsible for conducting your research ethically. Please consult your Faculty Advisor and other leaders in your field for guidance when you have questions about your study.

Feel free to let me know if you have any questions.
Alyson

Sent from my T-Mobile 4G LTE Device

APPENDIX B

MEDICAL OUTCOMES STUDY SHORT FORM 36

SF-36(tm) Health Survey

Instructions for completing the questionnaire: Please answer every question. Some questions may look like others, but each one is different. Please take the time to read and answer each question carefully by filling in the bubble that best represents your response.

~~Patient Name:~~ Sub ID: _____

~~SSN#:~~ _____ Date: _____

~~Person helping to complete this form:~~ _____

1. In general, would you say your health is:

   - ❑ Excellent
   - ❑ Very good
   - ❑ Good
   - ❑ Fair
   - ❑ Poor

2. Compared to one year ago, how would you rate your health in general now?

   - ❑ Much better now than a year ago
   - ❑ Somewhat better now than a year ago
   - ❑ About the same as one year ago
   - ❑ Somewhat worse now than one year ago
   - ❑ Much worse now than one year ago

3. The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

   a. Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.
      - ❑ Yes, limited a lot.
      - ❑ Yes, limited a little.
      - ❑ No, not limited at all.

   b. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf?
      - ❑ Yes, limited a lot.
      - ❑ Yes, limited a little.
      - ❑ No, not limited at all.

   c. Lifting or carrying groceries.
      - ❑ Yes, limited a lot.
      - ❑ Yes, limited a little.
      - ❑ No, not limited at all.

   d. Climbing several flights of stairs.
      - ❑ Yes, limited a lot.
      - ❑ Yes, limited a little.
      - ❑ No, not limited at all.

   e. Climbing one flight of stairs.
      - ❑ Yes, limited a lot.
      - ❑ Yes, limited a little.
      - ❑ No, not limited at all.

   f. Bending, kneeling or stooping.
      - ❑ Yes, limited a lot.
      - ❑ Yes, limited a little.
      - ❑ No, not limited at all.

g. Walking more than one mile.
- ❑ Yes, limited a lot.
- ❑ Yes, limited a little.
- ❑ No, not limited at all.

h. Walking several blocks.
- ❑ Yes, limited a lot.
- ❑ Yes, limited a little.
- ❑ No, not limited at all.

i. Walking one block.
- ❑ Yes, limited a lot.
- ❑ Yes, limited a little.
- ❑ No, not limited at all.

j. Bathing or dressing yourself.
- ❑ Yes, limited a lot.
- ❑ Yes, limited a little.
- ❑ No, not limited at all.

4. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

a. Cut down the amount of time you spent on work or other activities?
☐ Yes ☐ No

b. Accomplished less than you would like?
☐ Yes ☐ No

c. Were limited in the kind of work or other activities
☐ Yes ☐ No

d. Had difficulty performing the work or other activities (for example, it took extra time)
☐ Yes ☐ No

5. During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

a. Cut down the amount of time you spent on work or other activities?
☐ Yes ☐ No

b. Accomplished less than you would like
☐ Yes ☐ No

c. Didn't do work or other activities as carefully as usual
☐ Yes ☐ No

6. During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?
- ❑ Not at all
- ❑ Slightly
- ❑ Moderately
- ❑ Quite a bit
- ❑ Extremely

7. How much bodily pain have you had during the past 4 weeks?
- ❑ Not at all
- ❑ Slightly
- ❑ Moderately
- ❑ Quite a bit
- ❑ Extremely

8. During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

- ❑ Not at all
- ❑ Slightly
- ❑ Moderately
- ❑ Quite a bit
- ❑ Extremely

9. These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks.

a. did you feel full of pep?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

b. have you been a very nervous person?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

c. have you felt so down in the dumps nothing could cheer you up?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

d. have you felt calm and peaceful?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

e. did you have a lot of energy?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

f. have you felt downhearted and blue?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

g. did you feel worn out?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

h. have you been a happy person?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

i. did you feel tired?
- ❑ All of the time
- ❑ Most of the time
- ❑ A good bit of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

10. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)?
- ❑ All of the time
- ❑ Most of the time
- ❑ Some of the time
- ❑ A little of the time
- ❑ None of the time

11. How TRUE or FALSE is each of the following statements for you?

a. I seem to get sick a little easier than other people
- ❑ Definitely true
- ❑ Mostly true
- ❑ Don't know
- ❑ Mostly false
- ❑ Definitely false

b. I am as healthy as anybody I know
- ❑ Definitely true
- ❑ Mostly true
- ❑ Don't know
- ❑ Mostly false
- ❑ Definitely false

c. I expect my health to get worse
- ❑ Definitely true
- ❑ Mostly true
- ❑ Don't know
- ❑ Mostly false
- ❑ Definitely false

d. My health is excellent
- ❑ Definitely true
- ❑ Mostly true
- ❑ Don't know
- ❑ Mostly false
- ❑ Definitely false

APPENDIX C

MODIFIED BORGS DYSPNEA SCALE

0	Nothing at all
0.5	Extremely weak (just noticeable)
1	Very weak
2	Weak (light)
3	Moderate
4	Somewhat strong
5	Strong (heavy)
6	
7	Very strong
8	
9	
10	Extremely strong (almost max)
•	Maximal

REFERENCES

Arrebola, E., Gómez-Candela, C., Fernández, C., Lori, V., Muñoz-Pérez, E., Bermejo, L.M. (2011). Evaluation of a lifestyle modification program for treatment of overweight and nonmorbid obesity in primary healthcare and its influence of health-related quality of life. *Nutrition in Clinical Practice,* 26(3), 316-321. doi:10.1177/0884533611405993.

Bass, J. B. (1990). *Dyspnea.* Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK357/

Babb, T.G., Ranasinghe, K.G., Comeau, L.A., Semon, T.L., Schwartz, B. (2008). Dyspnea on exertion in obese women: association with increased oxygen cost of breathing. *American Journal of Respiratory and Critical Care,* 178(2), 116-123. doi: 10.1164/rccm.200706-875OC

Bernhardt, V., Babb, T.G. (2014a). Respiratory symptom differs in obese women with strong or mild breathlessness during constant-load exercise. *Chest,* 145(2), 361-369. doi: 10.1378/chest.12-2885

Bernhardt, V., Babb, T.G. (2014b). Weight loss reduces dyspnea on exertion in obese women. *Respiratory Physiology & Neurobiology,*204, 86-92. doi: 10.1016/j.resp.2014.09.004.

Bernhardt, V., Wood, H.E., Moran, R.B., Babb, T.G. (2013). Dyspnea on exertion in obese men. *Respiratory Physiology & Neurobiology,*185 (2), 241-248. doi:10.1016/j.resp.2012.10.007

Bernhardt, V., Stickford, J. L., Bhammar, D. M., Babb, T. G. (2015). Aerobic exercise training without weight loss reduces dyspnea on exertion in obese women. *Respiratory Physiology & Neurobiology,* 221, 64-70. doi: 10.1016/j.resp.2015.11.004

Bhammar, D.M., Stickford, J. L., Bernhardt, V., Babb, T. G. (2016). Effects of weight loss on operational lung volumes and oxygen cost of breathing in obese women. *International Journal of Obesity,* 1-7. doi:10.1038/iko.2016.21

Borg, G. A. (1982). Psychophysical bases of perceived exertion. *Med Sci Sports Exerc*, 14(5), 377-381.

Bentsen, S. B., Rokne, B., Wahl, A. K. (2012). Comparison of health-related quality of life between patients with chronic obstructive pulmonary disease and the general population. *Scandinavian Journal of Caring Sciences,* 27(4), 905-912. doi:10.1111/scs.12002

Center for Disease Control and Prevention. (2015a). *Adult BMI calculator.* Retrieved from https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/english_bmi_calculator/bmi_calculator.html

Centers for Disease Control and Prevention. (2016a). *Adult obesity facts.* Retrieved from https://www.cdc.gov/obesity/data/adult.html

Center for Disease Control and Prevention. (2016b). *Health related quality of life.* Retrieved from https://www.cdc.gov/hrqol/

Center for Disease Control and Prevention. (2015b). *Physical activity and health.* Retrieved from https://www.cdc.gov/physicalactivity/basics/pa-health/

DeLorey, D.S., Wyrick, B.L., Babb, T.G. (2005). Mild-to-moderate obesity: implications for respiratory mechanics at rest and during exercise in young men. *International Journal of Obesity,* 29,1039-1047. doi: 10.1038/sj.ijo.0803003

Healthy People 2020. (2017). *Health related quality of life and well-being.* Retrieved from https://www.healthypeople.gov/2020/about/foundation-health-measures/Health-Related-Quality-of-Life-and-Well-Being

Hu, J., Meek, P. (2005). Health related quality of life in individuals with chronic obstructive pulmonary disease. *Heart & Lung,* 34(6): 415-422. doi: 10.1016/j.hrtlng.2005.03.008

Jia, H., Lubetkin, E. (2005). The impact of obesity on health-related quality- of- life in the general adult US population. *Journal of Public Health,* 27(2), 156-164. doi:10.1093/pubmed/fdi025

National Cancer Institute at the National Institute of Health. (n.d.). *NCI dictionary of cancer terms.* Retrieved from https://www.cancer.gov/publications/dictionaries/cancer-terms?cdrid=306510

National Center for Biotechnology Information. (1994). *Plan and operation of the Third National Health and Nutrition Examination Survey, 1988-94. Series 1: programs and collection procedures.* Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/7975354

Marines-Price, R. (2015). *Sensory and affective dimensions of dyspnea on exertion in young obese women* (doctoral dissertation). Retrieved from University of Arizona Campus Repository, (http://hdl.handle.net/10150/595631).

Matura, L.A., McDonough, A., & Carroll, D.L. (2104). Health-related quality of life and psychological states in patients with pulmonary arterial hypertension. *Journal of Cardiovascular Nursing,* 29(2), 178-184. doi:10.1097/JCN.0b013e318275330d

Plowman, S. A., & Smith, D. L. (2013). Exercise physiology for health fitness and performance (Fourth Edition ed.). Baltimore, MD: Lippincott Williams & Wilkins.

Edwards, Phil. (2010). *Questionnaires in clinical trials: optimal design and administration.* Trails, 11(2). doi: 10.1186/1745-6215-11-2.

Rand Health, (2017). *RAND medical outcome study: measures of quality of life core survey from rand health.* Retrieved from http://www.rand.org/health/surveys_tools/mos/36-item-short Form/scoring.html

Sin, D. D., Jones, R. L., & Man, S. F. (2002). *Obesity is a risk factor for dyspnea but not for air flow obstruction*. Arch Intern Med, 162(13), 1477-1481. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12090884

Svensson, S., Eek, F., Christiansen, L., Wisén, A. (2017). The effect of different exercise intensities on health related quality of life in people classified as obese. *European Journal of Physiotherapy,* 19(2), 104-115. doi:10.1080/21679169.2017.1296021.

Talwar, A., Sahni, S., Kim, E. J., Verma, S., Kohn, N. (2015). Dyspnea, depression, and health related quality of life in pulmonary arterial hypertension patients. *Journal of Exercise Rehabilitation,* 11(5), 259-265. doi:10.12965/jer.150230

Wang, J., Sereika, S. M., Styn, M. A., Burke, L. E. (2013). Factors associated with health-related quality of life among overweight or obese adults. *Journal of Clinical Nursing, 22*(15/16), 2172-2182. doi:10.1111/jocn.12280.

BIOGRAPHICAL INFORMATION

Lauren Crane completed her Honors Bachelor of Science in Nursing at the University of Texas at Arlington in December 2017. Her research interests include holistic patient care and pediatrics. She begins her career at Texas Health Resources Presbyterian in Dallas, Texas in the Special Care Nursery. She plans to attend graduate school to become a Doctor of Nursing Practice and a Pediatric Nurse Practitioner.