

# Front Matter

Somya kumari, Pawan kumar and Golu kumar

B.Sc nursing IV year  
Elizabeth Pushpa Rani S.  
Assistant Professor  
Dept. of MSN

Narayan Nursing College,  
Gopal Narayan Singh University, Rohtas, Bihar

## ABSTRACT:

### Background:

Chronic obstructive pulmonary disease (COPD) is prevalent in India. The role of body mass index (BMI) in COPD symptoms exacerbations is unclear we analyzed the association between BMI and symptoms exacerbations in Bihar COPD Patient.

### Methodology:

It is a descriptive study. The study was conducted among 60 samples selected by universal sampling. Permission was taken from Institute Ethical Committee, NMCH. Informed consent was taken from all the patients, socio demographic data and clinical data has been collected by oral interview with patients and Height and weight measurement by standard stadiometer and weighing machine to calculate Body Mass Index. The data has been analyzed by descriptive and inferential statistics.

### Results:

Major findings of the study

- This study includes 60 patients, 38.33% of the study participants were male, and 61.66 % of them were females who diagnosed have COPD.
- 31.66 % of patients were in the age group 41 – 43 years followed by 36.66 % of the patient between the age group of 44 – 47 years and 31.66 % of patients were in age group of 48 – 50 years.
- 48.33 % participants are smokers. Majority of participants 36 (60 %) fall under the grade 3 of modified Dyspnea Scale.

### Conclusion:

In our study, BMI was moderately correlated with modified MRC Dyspnea Scale and exacerbations negatively. To some extent, BMI might be a useful indicator to predict the prognosis of COPD Patients and for long- term management.

**Keywords:** Body Mass Index (BMI), Chronic Obstructive Pulmonary Disease (COPD), , Exacerbations, MRC Dyspnea Scale, Prognosis

### Abbreviation List

WHO	: World Health Organization
COPD	: Chronic Obstructive Pulmonary Disease
BMI	: Body Mass Index
OPD	: Out Patient Department
NMCH	: Narayan Medical College and Hospital
ICU	: Intensive Care Unit
MRC	: Medical Research Council
GOLD	: Global Initiative for Chronic Obstructive Lung Disease
%	: Percentage
N	: Frequency

*“Association of body mass index of patients with chronic obstructive pulmonary disease with COPD symptoms and severity of exacerbations: A cross- sectional study among COPD patients attending general medicine OPD, NMCH, Jamuhar”.*

## INTRODUCTION

*“Breathing in, I calm my body.*

*Breathing out, I smile.*

*Dwelling in the present moment,*

*I know this is a Wonderful moment”*

- **Thich Nhat Hanh**

Chronic Obstructive pulmonary disease (COPD) is a preventable and treatable slowly progressive respiratory disease of airflow obstruction involving the airways, pulmonary parenchyma, or both (Global Initiative for Chronic Obstructive Lung Disease [GOLD], 2015). COPD exacerbations and other coexisting illness or co-morbidities contribute to the overall severity of the disease<sup>1</sup>.

COPD is widespread, 11.4 millions U.S adults (age 18 and over) are estimated to have the disease. However, close to 24 million have evidence of impaired lung function suggesting an under diagnosis of the condition. It is this South leading cause of death in American, claiming the lives COPD has been estimated at \$20.9 billion annually in direct care costs alone. However the burden

of COPD is over greater from global perspectives, where it is projected to the bank 5<sup>th</sup>2020 in burden of disease caused worldwide<sup>2</sup>.

Many factors can influence the development and progression of C O P D. Such as cigarette smoking<sup>3</sup>. COPD commonly become symptomatic during the middle adult year and the incidence of the disease is increased with age. Examination vital capacity and forced expiratory volume in 1 second (EEVI)-c o p d accounted and accelerates the physiological changes as described later. In COPD of the airflow limitation in both progressive and associated with lungs abnormality inflammatory response to noxious particle or gases. The inflammatory response offered throughout the proximal and peripheral airways, lung parenchyma and pulmonary vasculature (Gold, 2015)<sup>4</sup>.

Acute exacerbations of COPD are characterized by an increase in symptoms and deterioration in lung function and health status. They may be accompanied by the development of respiratory failure and/or fluid retention and represent an important cause of death<sup>5</sup>.

Pharmacological therapy for COPD is used to reduce symptoms, reduce the frequency and severity of exacerbations, and improve exercise tolerance and health status. To date, there is no conclusive clinical trial evidence that any existing medications for COPD modify the long terms decline in lung function. Post hoc evidence of such an effort with long acting bronchodilators and inhaled corticosteroids require confirmation in specifically designed trials<sup>6</sup>.

Body mass index (BMI) is a value derived from the mass (weight) and height of a person. The BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m<sup>2</sup>, resulting from mass in kilograms and height in metres. The BMI may be determined using a table[a] or chart which displays BMI as a function of mass and height using contour lines or colors for different BMI categories, and which may use other units of measurement (converted to metric units for the calculation)<sup>7</sup>. [b]

Body mass index (BMI) is an important parameter associated with mortality and health-related quality of life (HRQoL) in chronic obstructive pulmonary disease (COPD). However, informed guidance on stratified weight recommendations for COPD is still lacking<sup>8</sup>. Low body mass index (BMI) is a strong prognostic marker in stable chronic obstructive pulmonary disease (COPD)<sup>9</sup>. The role of body mass index (BMI) in COPD progression and prognosis is unclear<sup>10</sup>. This study aims to determine the association between BMI and symptoms exacerbations of COPD to support patient management.

## **Material and Methods:**

This study is to assess the relationship of BMI and symptoms exacerbation of patient with COPD.

### **Research approach**

Descriptive Approach

### **Research design**

A cross sectional design used for this study.

### **Setting of the study**

The study is conducted in NMCH, a tertiary care centre of Western Bihar Rohtas District under the Deo Mangal Memorial Trust. It has more than 500 daily out- patient strength and annual admission of nearby 5000 patients. It has equipped with super specialty departments to cater to various patient populations. The inpatient block has 50 distributed among various medical, surgical women and child health and other super specialties. NMCH has about 100 faculty and 60 residents' physicians and over 300 nursing, administrative and support staff. The setting of the study General Medicine OPD, NMCH.

### **Population**

#### **Target population;**

The target population of the study included patient suspected to have COPD who attending General medicine OPD, NMCH.

#### **Accessible population**

The accessible populations are patients who are diagnosed to have COPD.

### **Sample**

Sample consisted of 60 patients attending in NMCH.

### **Sample size calculation:**

The sample size was calculated according to the precision method. Sample size estimated is 60 with the expected percentage of patients with BMI > 25kg/m<sup>2</sup> to correlate with significantly

### **Sampling technique**

Universal sampling technique is used to select the study subjects. All patients who fulfilled the inclusion and exclusion criteria were selected the study. All 60 patients fulfilled the criteria of the study.

### **Criteria for sample selection**

Inclusion criteria

1. All patients undergoing diagnostic COPD.

2. 40 years to 45 years

Exclusion criteria

1. Patients with other co-morbidities
- 2.

### **Variable**

1. Sociodemographic variable
2. Clinical variable

### **Instruments**

The instrument consisted of a background proforma to collect demographic and clinical data.

Description of instrument

1. Demographic Data

Demographic data had a set of items oriented to socio- demographic variables included age, sex, educational status, income, diagnosis, physical activity, medical history, medication adherence, duration of COPD.

2. Clinical data

### **Validity**

The demographic and clinical data was developed by the investigator based on a review of the literature. The devised instrument was evaluated by experts from the field of medicines and nursing. Consensus in all items was obtained for all experts.

### **Reliability**

Reliability was established with test re – test method in 5 % of participants.

Reliability of stadiometer and weighing machine was established through inter observer reliability. ( $r = 0.9$ )

### **Data collection procedure**

- Time period for Data collection was six months.
- By universal sampling technique, a patient who fulfilled the inclusion criteria was selected.
- A written informed consent was taken from COPD patients attending general medicine OPD.
- The demographic data and clinical data were collected through clinical data proforma and written records.
- Height and weight measurement will be done using a standard stadiometer and weighing machine.
- Indian BMI will be calculated by the height and weight of the patient.
- BMI will be considered attenuated if it is between 18.5 – 24.9
- BMI is compared with no. of symptoms exacerbation of COPD patient.

### **Protection of human subjects**

The approval of the research proposal was obtained from the Ethical Committee, NMCH. Informed written consent of each participant was given freedom to withdraw from the study at any period. The assurance was given to the study participants that anonymity and confidentiality would be maintained.

### **Pilot study**

To assess the feasibility of the study a pilot study was conducted. A sample of 6 patients was included in the study. A patient who met the inclusion criteria was included. Informed consent was taken from the pilot study from participants. The instrument which included demographic and clinical data was found to be feasible and appropriate to conduct the main study. A total of approximately 10 % of the calculated sample was included in the study (6 patients). By the pilot study feasibility of the study was found out.

### **Data Analysis**

The data Analysis was performed by using both descriptive (frequency, percentage) and inferential statistics (Chi-square test) were used. Chi-square test was used to find the association between the numbers of exacerbation and BMI. All statistical analysis was carried out at 5 % level of significance with  $p$  value  $< 0.005$

### **Result/ Discussion:**

This chapter discusses the findings of the study derived from the statistical analysis and its pertinence to the objective set for the study and related review of literature of the study.

### **Objective of the study:**

- To assess the socio- demographic profile of COPD patient.
- To assess the BMI of the COPD patient.
- To identify the symptoms and severity exacerbations of COPD.
- To co-relate the BMI with COPD symptoms and exacerbations.

### **Description of the study population:**

In the present study, 60 patients underwent Chronic Obstructive Pulmonary Disease. 31.66 % of patients were in the age group 41 – 43 years followed by 36.66% of the patient between the age group of 44 – 47 years and 31.66% of the patient between age

group of 48 – 50 years. The mean age of the study participants was  $45 \pm 5.5$  years. The majority of the study participants were female 61.66%.

### **Conclusion**

This chapter presents the summary, conclusions, implications and recommendations for further research.

#### **Summary of the Study:**

The purpose of this study was to assess the relationship of BMI with symptoms exacerbation of COPD patient. A prospective observational design was used for the present study.

The conceptual framework used for the study was based on Betty Newmans System Model. The data regarding socio demographic data, clinical data collected by oral interview, background Performa and written records. Height and weight was measured by stadiometer and weighing machine.

The setting of the study included General Medicine OPD of GNSU. Universal sampling technique was used to select the study participant. The sample consisted of 60 patients attending General Medicine OPD in NMCH. BMI were relating to symptoms exacerbations of COPD.

The data analysis was performed by using both descriptive (frequency and percentage), and inferential statistics (chi-square test), Fisher's exact test, inter quartile range were used to summarize the data collected. Data analysis were performed using SPSS version 19.

#### **Study findings are summarized below:**

- In 60 cases, 38.33% were male among them 48.33 % were smokers and 50 % were non smokers.
- According to BMI Grades all cases were classified into four groups as follows:

Under weight (35 % cases), Normal weight ( 30 % cases), over weight ( 25 % cases) and obesity (10% cases)

- There was no significant difference between WBC counts, neutrophils count among group. As compared to obesity group, the value in each other 3 groups was significantly higher.
- Modified MRC Dyspnea Scale were all significantly increases with the increase in BMI.

#### **Conclusion:**

In spite of more advance screening methods and techniques body mass index is easy to perform, noninvasive, more specific and cost effective. The results can be interpreted immediately. BMI is the identifying the symptoms exacerbation of COPD.

#### **Implications for Nursing:**

##### **Nursing Education**

The study may help nurses to identify the symptoms exacerbation of COPD. The findings also help nurses to identify the patient who needs immediate medical intervention. A positive outlook can be created among nurses while caring for the patients while emphasizing this tertiary prevention strategy. Nursing educational programs should be conducted by resourceful nurses. The nursing curriculum should equip medical- surgical nursing students to develop skill in measuring body mass index and to relate with the COPD symptoms exacerbations.

##### **Nursing Research:**

The present study can be a valuable resource for further research. The findings of the study can be disseminated to staff nurses, community nurses, nurse practitioner and student nurses who can be utilized for providing evidence- based care for the patients by early identification of the symptoms exacerbations of COPD patient with the screening tool.

##### **Nursing Practice:**

The nurse during clinical practice when performing history collection and physical examination, if nurses suspect the patient can develop BMI. The nurses can teach life style modification, diet, stop smoking, stay away from second hand smoke, have healthy diet, do breathing exercise, improve both indoor and outdoor air quality, avoid exposure to fumes and dust.

##### **Nursing Administration:**

As a nursing administrator, he/she should plan, organize, supervise and evaluate various nursing care procedure aspect about assessing body mass index and its interpretation. She should motivate and utilize the staff nurses and students to encourage the public in the screening program for COPD. Policies can be formulated in routine assessment of BMI. The present study helps the nursing administrators in recognizing the need for conducting continuing nursing education programs on importance, interpretation and COPD risk assessment. Nurses can update their knowledge by participating in seminars and discussion about ankle BMI and COPD. Nurse administrator should ensure that the staff nurses are capable of identifying the patient who is at risk of developing COPD and performing body mass index. Nurse administrator should appropriately supervise the staff nurses while caring for the patient while performing annual competency skill assessment. Onsite performance appraisal, motivation, and rewards on apt time are some of the managerial measures to be imparted to staff nurses to assess patient's risk. Nursing service departments should be collaborating organization to teach, train and supervise staff nurses of the hospital along with general medicine department and which in turn would help in developing educational modules for the care of COPD patients.

**Recommendations for further research**

- For the generalization of the study results, a similar study can be replicated with the larger sample.
- A comparative study can be conducted in low range BMI patient.
- A similar study can be conducted in patient in relation with BMI with hypertension.
- A study can be conducted in assessing the knowledge and skill of staff nurses in assessing body mass index.
- A study can be conducted to assess body mass index as an independent predictor of symptoms exacerbations.

**TABLE 1:** Study participants characteristics – Demographic Variables (N= 60).

Demographic Variable	Frequency
Age in years (Mean)	45±5.5
<b>Sex</b>	
Male	23 (38.33%)
Female	37 (61.66%)

The above table shows that the mean age of the participants' were 45±5.5 years. 38.33% of the patients were males and majorities (61.66%) were female.

**Table 2:** Study participant characteristics – clinical variables N = 60

CLINICAL VARIABLES			
Sl No	Parameters	Frequency (No.)	Percentage (%)
1	Increase WBC	60	100%
2.	Increase Neutrophils	60	100%
3.	Increase Eosinophils	0	0%
4.	Compliance of pharmacological treatment	36	60%
5.	Co- morbidities	27	45%
6.	Smoking		
	• Smoker	29	48.33%
	• Non smoker	30	50%
7.	Exacerbations		
	• No. of moderate exacerbations	2	3.33 %
	• No. of severe exacerbations	41	68.33 %
8.	Modified MRC Dyspnea Scale		
	• Grade 0	2	3.33 %
	• Grade 1	9	15 %
	• Grade 2	7	11.66%
	• Grade 3	36	60 %
	• Grade 4	6	10%
7.	BMI		
	• Under weight	21	35 %
	• Normal weight	18	30 %
	• Over weight	15	25 %
	• Obese	6	10 %

The above table depicts that 100% of the participants exhibits increased WBC and neutrophils counts on the contrast none of them has increased eosinophils count. 60% of the participants has good compliance with pharmacological treatment. 41



participants have severe exacerbations. Majority of participants 36 (60%) fall under the grade 3 of modified MRC Dyspnea Scale. In BMI classification majority of the participants fall under the category of underweight (i.e.) 21 participants accounts for 33%.

**Table 3:** Correlation of clinical characteristics of COPD patient with BMI classification (n=60)

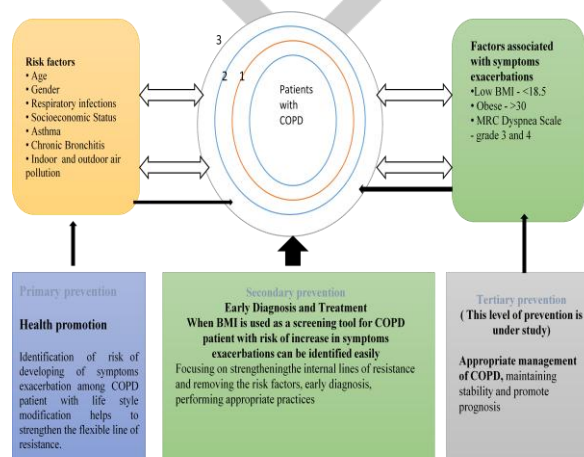
Characteristics	Underweight BMI < 18.5 (N= 21)	Normal weight (BMI 18.5 – 25) (N= 18)	Overweight (BMI 25-29.9) (N= 15)	Obesity (BMI >30) (N= 6)	P value
<b>Gender</b>					
- Male	8	6	8	1	0.001
- Female	13	12	7	5	0.143
<b>Age</b>					
- 41 – 43	5	9	5	0	0.177
- 44 – 47	10	3	7	2	0.027
- 48- 50	6	6	3	4	0.003
<b>Smoking</b>					
- Smoker	9	4	12	4	0.504
- Non smoker	11	15	3	2	0.038
					0.082
<b>Increased WBC</b>	21	18	15	6	0.784
<b>Increased Neutrophils</b>	21	18	15	6	0.014
<b>Increased Eosinophils</b>	0	0	0	0	0.042
<b>Moderate exacerbation</b>	8	7	5	1	0.527
<b>Severe exacerbation</b>	13	11	10	5	0.099
<b>MRC Dyspnea scale value</b>					
- Grade 0	0	2	0	0	0.073
- Grade 1	2	0	3	3	0.008
- Grade 2	1	1	3	2	0.038
- Grade 3	8	6	10	12	0.028
- Grade 4	1	0	2	3	0.144

This table briefs correlation of clinical characteristics of COPD patient with BMI classification in which the female patient more positively correlated with underweight which falls under the BMI grade of less than 18.5 kg/m<sup>2</sup>. And other hand male patients are moderately correlated with BMI classification more than 30 which is obese.

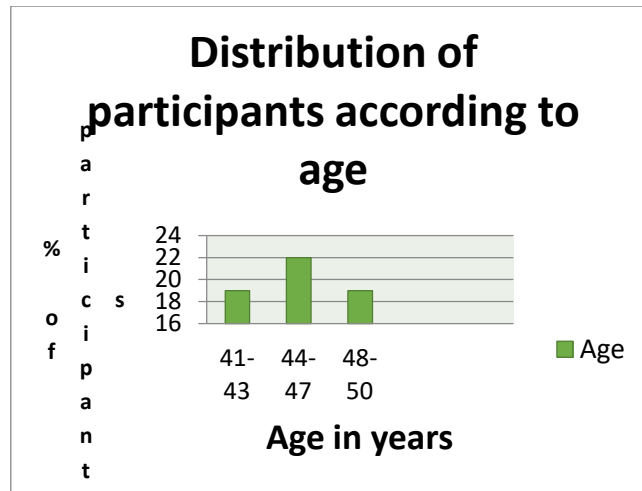
In a next section the maximum number of patient they age group 44-47 are positively correlated with underweight classification of BMI. Most of the underweight patient almost 21 participants are positively correlated with underweight BMI. On the contrary increase WBC and Increase eosinophils are poorly correlated with obese patient which is 10 % i.e. 6 participants. None of the patients were found to have increase eosinophils. Out of 60 patients only one obese patient found to have moderately exacerbations. On the contrary 5 obese patients had severe exacerbations and positively correlation.

In underweight classification of BMI 8 participants had moderate exacerbation and moderately correlated with BMI and 13 patients out of 60 patients had severe exacerbations and positively correlated with BMI.

No. of symptoms exacerbations is significantly at higher rate among obese population and no. of symptoms exacerbation is relatively lower among grade 1 and grade 0. Almost 32 participants in obese category has get grade 3 in modified MRC Dyspnea Scale.

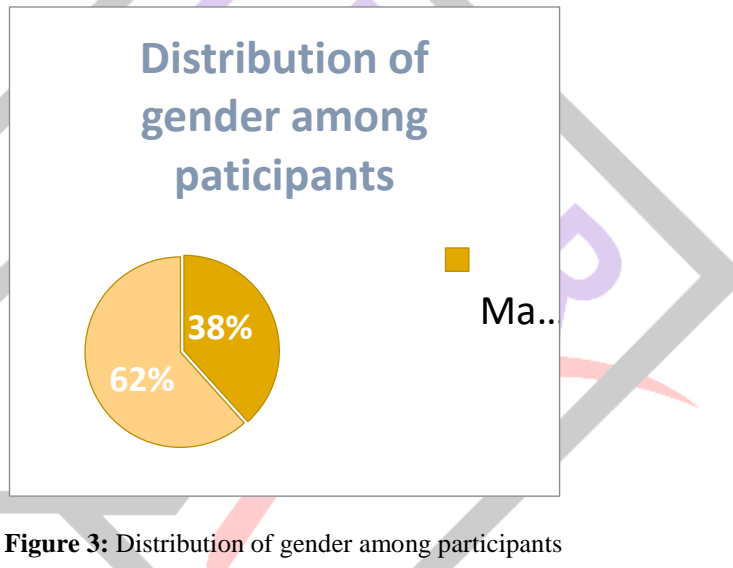


**Figure 1:** Conceptual Framework – Based on Betty Newmans System Model



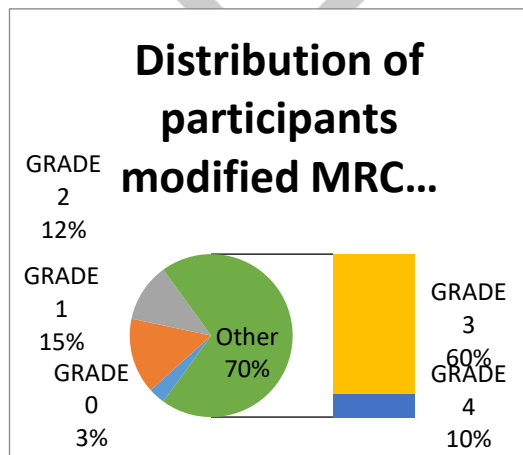
**Figure 2:** Distribution of participants according to Age

The above figure shows that out of 60 participants who diagnosed COPD 31.66 % of patients were in age group 41 – 43 years followed by 36.66 % of patients between the age group of 44 – 47 years and 31.66 % of patients were in age group of 48 – 50 years. Majority of the patients were female 61.66%



**Figure 3:** Distribution of gender among participants

The above figure summarizes the distribution of gender among participants. Out of 60 participants, 23 (38%) were male and 37 (62%) were female.



**Figure 4:** Distribution of participants modified MRC Dyspnea Scale

The above figure, summarize the distribution of modified MRC Dyspnea Scale, out of 60 participants followed by 2(3%) in grade 0, followed by 9 (15%) in grade 1, 7 participants (12%) in grade 2, followed by 36 (60%) in grade 3 and followed by 6 (10%) in grade 4.

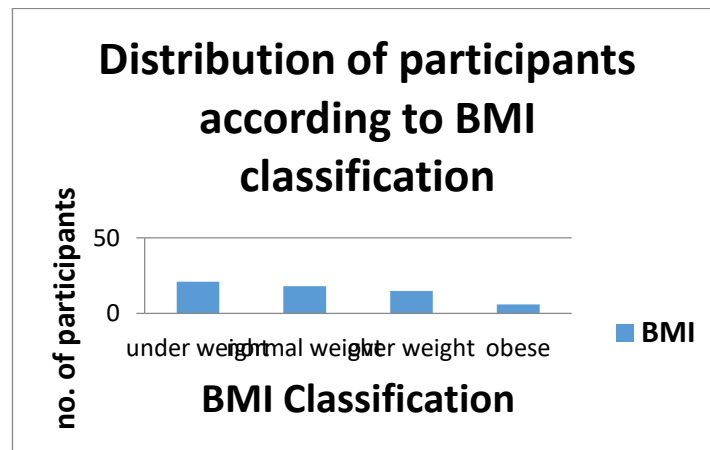


Figure 5: -Distribution of participants according to BMI classification

The above figure outlines the distribution of participants according to BMI classification. Out of 60 participants, the maximum patient is underweight i.e.21 (35%), it is followed by normal weight category upon for 18 participants (30%), subsequently 15 participants are overweight (25%) and .the minimum patient is obese i.e. 6 (10%).

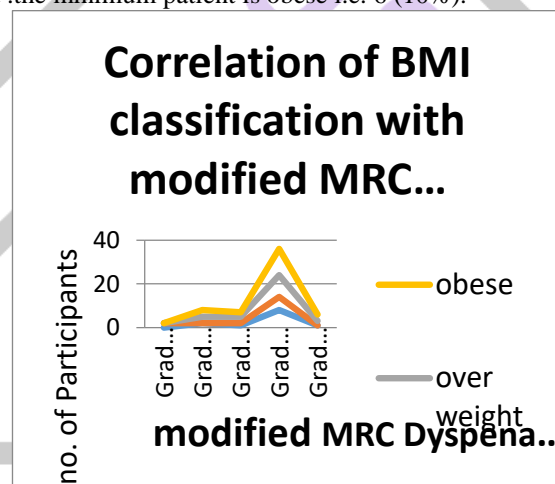


Figure 6: Distribution of subjects according to correlation of BMI classification with modified MRC Dyspnea Scale.

The above graph describe that no. of symptoms exacerbations is significantly at higher rate among obese population and no. of symptoms exacerbation is relatively lower among grade 1 and grade 0. Almost 32 participants in obese category has get grade 3 in modified MRC Dyspnea Scale.

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