

## IS NUTRITIONAL COUNSELING EFFECTIVE IN WEIGHT REDUCTION IN OBESE PATIENTS?

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### Contribution

GR and SH conceived the idea and designed the study. AI and AMG did data collection and helped in manuscript writing. RA did final review. All authors contributed equally to the submitted manuscript.

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### ABSTRACT

**Objective:** To evaluate the effects of nutritional counseling on weight loss in overweight/obese patients with established coronary artery disease (CAD).

**Methodology:** This was an interventional study conducted in Preventive section, Cardiology Department, Lady Reading Hospital, Peshawar. The study was conducted from January to September 2018. Data was collected from 200 CAD patients with BMI 25 and above. Out of these, subjects fulfilling inclusion criteria were selected. Baseline data from all subjects including demographic and anthropometric data was recorded. The caloric intake was calculated and a heart healthy diet plan with more vegetables, fruits and whole grains and reduced fats was recommended to subjects. The subjects were advised to follow the diet plan for 3 months. There were 2 follow up visits spaced at 6-week intervals. At the end of 3 months each subject was weighed again and waist circumference was measured. BMI was recalculated and difference in before and after nutritional counseling was noted. Data was analyzed by statistical program for social sciences SPSS version 16.

**Results:** Out of 200 CAD patients, a sample of 50 subjects was included in analyses. Mean age of subjects was  $52.12 \pm 10.37$  years. Males were 42%. Among the subjects 22% were educated, 88% had poor SES, 86% pursued sedentary life style. Diabetes was documented in 50% and hypertension recorded in 76% subjects. Mean BMI and before and after nutritional counseling was  $31.33 \pm 3.92$  kg/m<sup>2</sup> and  $27.97 \pm 3.28$  kg/m<sup>2</sup> ( $p < 0.001$ ). Waist circumference reduced from  $41.41 \pm 3.47$  cm to  $37.62 \pm 2.7$  cm ( $p < 0.001$ ). Weight reduced in 80% subjects.

**Conclusion:** Nutritional counseling was effective in weight loss in overweight/obese patients with coronary artery disease in a majority of patients with significant reduction in weight and BMI.

**Key Words:** Coronary Artery Disease (CAD), BMI, Waist Circumference, Nutritional Counseling

## INTRODUCTION

Cardiovascular disease is the leading cause of death, a major cause of disability worldwide.<sup>1</sup> According to WHO cardiovascular disease is defined as a class of diseases that affect the heart and blood vessels.<sup>1</sup> In the US every 1 min 23 seconds an American dies due to coronary heart disease.<sup>2</sup> In Pakistan 1 out of 4 middle age adults have coronary artery disease (CAD).<sup>3</sup> Obesity is prevalent throughout the world.<sup>4</sup> Being overweight is one of the major factors for many chronic diseases like cardiovascular disease, diabetes mellitus, hypertension, cancer.<sup>5</sup> Obesity is an important risk factor for coronary artery disease (CAD), ventricular dysfunction, congestive heart failure, stroke, and cardiac arrhythmias. Obesity is an independent risk factor for cardiovascular disease (CVD) and is associated with advanced CVD requiring procedures such as percutaneous coronary intervention (PCI). It leads to reduction in life expectancy and a higher mortality rate.<sup>6</sup> The prevalence of obesity has increased dramatically worldwide over the last decades and has now reached epidemic proportions. For example, the prevalence of obesity has increased nearly double between 1980 and 2008. According to WHO, 35% of adults worldwide, aged >20 years were overweight (34% men and 35% women) in 2008.<sup>7</sup> Newfoundland and Labrador (NL), a Canadian province, has the highest rate of obesity in the country and is estimated 71% of the province's population will be either overweight or obese by 2019.<sup>8</sup> Weight loss has been associated with improvement in preexisting cardiovascular risk factors including hypertension (HTN), diabetes, dyslipidemia and cardiac mortality.<sup>9</sup> In a study by Rubinshtein et al. they examined the association of body mass index and incidence CAD.<sup>10</sup> Weight loss in obese patients can also improve or prevent many of the obesity related risk factors for CAD such as type 2 diabetes mellitus, dyslipidemia, hypertension and can improve diastolic function. Therefore, it is important for cardiovascular healthcare professionals to understand the clinical effects of weight loss and be able to implement appropriate weight-management strategies in obese patients. Obesity is often described by classical parameters such as body mass index (BMI), waist circumference (WC), and waist-to-hip ratio (WHR).<sup>11</sup> According to WHO classification overweight and obesity were classified as BMI > 25 kg/m<sup>2</sup>. Weight loss in overweight/obese patients is possible through life style modification. These include intake of heart healthy diet, regular physical activity and reduction in mental stress. The onset of cardiovascular disease can be lowered by the consumption of heart healthy diet that includes fruits, vegetables, whole grains and excludes excessive intake of foods that have saturated fat.

The study will help patients to reach and maintain a healthy body weight and BMI. This will result in improvement in their risk factor profile thus lowering the incidence of a second event of MI. The aim of this study is to see the effect of nutritional counseling on reduction of calories and consumption of heart healthy diet on weight loss.

## METHODOLOGY

This was an interventional study done in Preventive section, Cardiology department, Lady Reading Hospital, Peshawar. The study was done from January 2018 to September 2018. Subjects were selected among patients being counseled after admission

for acute coronary syndrome or post angiography or PCI who were overweight/obese with BMI more than 25. The data was collected from subjects through informed verbal consent. Subjects from both genders and, all age groups were included. Convenient sampling was utilized including all consecutive patients with BMI above 25. Patients were excluded if they were not stable, had recurrent chest pain, angina or heart failure. Those who lived beyond 50 km radius of Peshawar and were not able to commute were excluded.

Demographic and anthropometric data was collected from each subject. A detailed account of base line dietary patterns, eating habits, and food preferences from subjects were recorded. For each subject a meal plan was designed to meet their individual needs. Daily total caloric intake and deficit was calculated and explained to the subjects so that target weight could be achieved. The meal plan focused on a heart healthy diet consisting of fruits and vegetables, whole grains, and a cut down on saturated fat, added sugar and salt. Subjects were given a variety of choices and advised to increase intake of vegetables and fruits. They were encouraged to include whole grains such as oatmeal, barley, maize, cornmeal and whole wheat in their diet. An advice on healthy cooking methods with reduction in use of fats was given. . All subjects were sent mobile texts every week containing motivational messages on benefits of losing weight and instructions and to comply with the diet plan. Subjects were asked to follow the diet plan for 3 months. There were 2 follow up visits spaced at 6 weeks interval. At the end of the three months, subjects were reassessed for total weight loss. BMI was recalculated and waist circumference was measured for each subject.

Frequencies and percentages were used to summarize categorical data. Continuous variables like age were analyzed to find mean and standard deviation. Paired-T test was used to compare means and SD before and after dietary intervention. Data was analyzed by statistical program for social sciences SPSS version 16.

## RESULTS

The data was collected from 200 subjects through informed verbal consent. Subjects from both genders and, all age groups were included. Out of 200 subjects, 57 subjects met the inclusion criteria and were selected. Out of 57 subjects selected, two succumbed to death and five were lost to follow up. Data from 50 subjects was recorded. The demographic characteristics of the subjects is shown in table 1. Study population was 50. Mean age was 52.12 ± 10.37 years. Male patients were 44%. Among the subjects 22% were educated, 88% had poor SES-subjects with income below 20,000, 98% were married, 52% had residence in urban area, 66% had nuclear family type and 86% pursued sedentary life style. Diabetes was documented in 50%, hypertension recorded in 76% subjects. and smoking in 16%. The mean and standard deviation of baseline BMI 31.33 + 3.92 Kg/m<sup>2</sup> and waist circumference (WC) 41.40 + 3.47cm.

**Table 1: Demographic Characteristics of the Study&Baseline BMI, WC. n = 50**

Variables	Frequency (%)
Age	Mean age = 52.12 $\pm$ 10.37
<b>Gender</b>	
Male	22 (44%)
Female	28 (56%)
<b>Education</b>	
Educated	11 (22%)
Non -educated	39 (78%)
<b>Residency</b>	
Rural	24 (48%)
Urban	26 (52%)
<b>Socio-economic status</b>	
Poor < 20000	44 (88%)
Satisfactory > 20000	6 (12%)
<b>Marital status</b>	
Married	49 (98%)
Un -married	1 (2%)
<b>Patients with Diabetes</b>	
Yes	25 (50%)
No	25 (50%)
<b>Patients with Hypertension</b>	
Yes	38 (76%)
No	12 (24%)
<b>Family type</b>	
Joint	17 (34%)
Nuclear	33 (66%)
<b>Smoker</b>	
Yes	8 (16%)
No	42 (84%)
<b>Physical Activity Level</b>	
Sedentary	43 (86%)
Lightly active	7 (14%)
Baseline BMI	31.33 $\pm$ 3.92
Waist Circumference	41.40 $\pm$ 3.47

**Table 2. Comparison of Baseline BMI and WC with BMI and WC at Follow Up Visit 2 and 3**

Circumference (WC)	Baseline	Follow up 1	Follow up 2	P-value
BMI	31.33±3.92	29.55±3.50	27.97±3.28	< 0.001
Waist	41.40±3.47	39.62±3.00	37.62±2.74	

## DISCUSSION

In our study dietary counseling was found to be effective in reduction of BMI and waist circumference in 80% of the subjects.

Joshua et al. 2016 did a study on cardiovascular effects of weight loss.<sup>12</sup> Weight loss limited to 5–10% was shown to be sufficient for cardiovascular health benefits. A data from 401 overweight and obese patients was recorded and subjects were enrolled in weight loss program from 2003 to 2011. There was a significant reduction weight, with lowering of cholesterol, triglycerides, and blood glucose levels. Subjects experienced significantly greater improvements in risk factors who lost >10%. This was a 15-week program included review of dietary records, life style modification with a registered dietitian. The diet consisted of heart healthy meal plan, of approximately 1200 kcal/day. The subjects were asked to include regular physical activity of 150 minutes of moderate intensity every week. BMI was calculated and the difference between the patient baseline weight and weight at the end of 15 week was recorded.<sup>12</sup> In our study the same protocol was followed but for a period of 3 months. Our study showed significant weight loss and reduction in waist circumference after intervention.

A study done in Iran by Behrooz et al. studied the nutritional status of patients with and without coronary artery disease (CAD).<sup>13</sup> This cross-sectional study evaluated the nutritional status in patients with coronary artery disease and matched controls. The nutritional profile was assessed from both groups. Patients with coronary artery disease (CAD) had higher BMI and more frequently diagnosed with diabetes, hypertension and hyperlipidemia. The study participants were also encouraged patients to do physical activity. They found a significant difference between patients who were asked to follow a heart healthy Mediterranean diet when compared to their matched counterparts in weight and BMI. It was found in the same study that increase intake of vegetables plays an important role in weight loss and thus in preventing CAD and its risk factors.<sup>13</sup> In our study the subjects were given a heart healthy diet plan recommending increase in take of fruits and vegetables. This not only helped in weight loss but also most subjects reported a sense of general well being and improved self esteem.

The Framingham Heart study is a 26-year follow up study.<sup>6</sup> This study indicated that obesity, measured by Metropolitan relative weight (MRW) used as a measure of body mass index was a significant independent predictor of CVD. CHD accounted 75% for men and 66% for women. The risk of CVD increased as the BMI increased in both genders. There was also a greater risk of sudden death in both genders and all age groups with increasing MRW.<sup>6</sup>

A longitudinal study done in 1960 in Zutphen showed that the consumption of dietary fibers can reduce the risk of coronary heart disease by reducing blood cholesterol, helping in weight

reduction and lessen the overall mortality due to CAD.<sup>14</sup> In our study, the dietary plan encouraged an increased intake of whole grain rich in fiber. The subjects were asked to include a variety of grain including, oatmeal, barley, maize and cornmeal. All these grains are cheap and readily available. This was beneficial as most of the subjects could relate to these foods and were motivated to try healthy swaps.

Quinn R. Pack et al. assessed the impact of weight loss in patients with coronary artery disease (CAD). They considered weight loss “intentional” when occurred in the presence of programmed therapeutic lifestyle changes (TLC) and observational” when no such program was specified. A total of 35,335 patients) were included. Intentional weight loss was associated with improved outcomes and reported weight loss is associated with TLC in CAD patients.<sup>15</sup>

In our study we found that a structured diet plan with reduced calories was more beneficial in weight loss than general dietary advises on heart healthy eating. Patients remained motivated when they felt they were to be held accountable after every 6 weeks. It is important to have a trained and qualified nutritionist in the cardiac rehabilitation program to help patients successfully achieve their weight loss goals that are extremely important to their heart health and improvement of cardiac risk factor profile.

Our study had limitations. The sample size was small and it was done in a single center and hence the results could not be generalized. There was no control group thus making it difficult to compare the results of weight loss in subjects not given a structured heart healthy dietary plan. There were some strengths of our study. The intervention was delivered by a trained, well qualified nutritionist with an experience to work in hospital setting. This greatly helped the subjects to remain motivated throughout the study period.

## CONCLUSION

The study shows that nutritional counseling was effective in weight loss in overweight/obese patients with CAD.

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