



Original article

Physical Exercise: An Effective Intervention In Increasing Self-Esteem of Obese Patients

Bhuwan Sharma¹, Hemant Mahajan*², S. R. Suryawanshi³, Amit Bhondve⁴

¹Junior Resident, Department of Community Medicine, TN Medical College, Mumbai, India

²Assistant Professor, Department of Community Medicine, RCSM GMC Kolhapur, India

³Professor and H.O.D, ⁴Junior Resident Department of Community Medicine, TN Medical College, Mumbai, India

ABSTRACT

Introduction: Obesity is perhaps the most prevalent form of malnutrition. As a chronic disease, prevalent in both developed and developing countries, and affecting both children and adults replacing the more traditional public health concerns including under-nutrition. For industrialized countries, it has been suggested that such increase in body weight has been caused primarily by reduced levels of physical activity, rather than by changes in food intake or other factors. So the present study is carried out to assess the impact of Physical Exercise on BMI and Self-esteem of obese population in an urban slum of Mumbai. **Material and Methods:** A descriptive epidemiological study was conducted at Cheetah Camp urban slum which is a field practice area of the department of Preventive and Social Medicine, TN Medical College, Mumbai. Obese patients above 40 years of age were included in this study. The information was gathered by personal interview using semi-structured Schedule. **Results:** Out of 350 subjects 163 (46.57%) were males. At the beginning of study the Mean Self-esteem levels of group A and group B were 19.25 and 19.47, which changed to 22.06 and 19.23 respectively after the Intervention. Mean systolic BP, Diastolic BP, and Body Mass Index (BMI) was also decreased in group A (intervention group). **Conclusion:** Physical exercise can play a significant role in improving the Self-esteem of obese individuals by decreasing BMI. Medical professionals should educate patients about the importance of physical exercises and encourage them to do it.

KEYWORDS: BMI, Obesity, Physical exercise, Self-esteem, Urban slum

INTRODUCTION

Obesity has reached epidemic proportions in India in the 21st century, with morbid obesity affecting 5% of the country's population [1]. India is currently facing a "double burden" of disease, while we continue to deal with the problems of infectious disease and under-nutrition, we are now

experiencing a rapid upsurge in non-communicable disease risk factors such as obesity and overweight, particularly in urban settings.

In addition to various medical risks, previous work has suggested that obesity may have an important relationship with psychosocial

conditions, such as low self-esteem which can lead to depression [2].

Obesity has been traditionally considered as a disease of affluence. High prevalence of malnutrition in people belonging to low socio-economic strata in developing countries led to the assumption that obesity will not be a crucial problem in them. Whereas rural population usually has low risk of development of obesity in India [3] their migration to metropolitan cities exposes them to several adverse lifestyle and environmental influences. In cities they usually settle down in urban slums, and take to daily wage jobs. Several lifestyle alterations result from this transition: changes from their traditional penurious eating habits, exposure to severe stress, decreased physical activity, and increase in smoking, tobacco chewing and alcohol intake. Unfortunately, this population has not been researched in detail.

Aim and Objectives

To assess the impact of Physical Exercise on BMI and Self-esteem of obese population in an urban slum of Mumbai.

MATERIAL AND METHODS

The study was conducted at Cheetah Camp urban slum which is a field practice area of Department of Preventive and Social Medicine, of T.N. Medical College, Mumbai. This is situated at an eastern suburb of Mumbai which comes under the jurisdiction of M East Ward of Municipal Corporation of Greater Mumbai. Study population was selected from obese patients of age 40 years & above.

The present community based descriptive epidemiological interventional study was conducted during the period of October 2009 to September 2011.

Total Population of Study Area = 1, 13,000.

Population > 40 years = 20,340 (Applying national demographic parameters).

Prevalence of Obesity >40 years in an urban slum =14 % [4].

Expected number of obese patients in study population = 2,848

Taking 10 % of expected patients = 284.8, and applying for attrition losses (20%)

Sample size (n) =/ > 350. So, total of 350 overweight and obese patients with BMI > 23 were involved. The subjects were categorized according to Western Pacific Region of WHO criteria pertaining to obesity (WPRO criteria, 2000) into following groups:

BMI 23 -24.99kg/m² as Overweight; BMI 25 – 29.99 Kg/m² as Obesity I; BMI ≥ 30 Kg/m² as Obesity II (Morbid Obesity) [5].

This study was conducted in the following 6 phases-

1. Preparatory Phase: October 2009 to December 2009 (2 months)
2. Phase of Pre Intervention Data Collection: January 2010 to March 2010 (3 months)
3. Intervention Phase: April 2010 to March 2011 (1 year)
4. Phase of Post Intervention Data Collection: April 11 to June 11 (3 months)
5. Phase of Data Analysis: July 2011 to August 2011 (2 months)
6. Documentation Phase: September 2011 (1 month)

Semi structured interview schedule was constructed relevant to the study. This interview schedule was tested by pilot study on 35 Obese patients attending geriatric clinic in Urban Health Center. Appropriate changes were done based on pilot study and the interview schedule was finalized. A checklist was prepared for interview schedule, observation and Physical exercise session. Voluntary consent form was prepared in English, Hindi and Marathi.

By taking, inclusion and exclusion criteria into consideration, total 350 overweight and obese subjects were selected by employing Systemic random sampling method. Home visits were done between 10.00 am to 4.00 pm on working days.

The information was collected about various socioeconomic factors, family history, addiction, exercise, associated disorders, life style etc. on preformed, pre tested interview schedule by investigator himself. Height, Weight and Blood pressure were measured by using appropriate technique. Self-esteem analysis was done by administering Rosenberg Self-esteem Scale [6].

Participants were followed up over a period of 12 months from April 2010 to March 2011 for intervention. Each obese patient had been given one individual number like 1/2010 to 350/2010. Regular follow up and monitoring of Weight, Blood pressure, Blood sugar and Self esteem score was maintained in that register.

Formation of batches and fixing of timing

The 350 subjects were then divided randomly into two groups A and B of 175 subjects each by using table of random numbers. Each group was then further divided into batches. Each batch was comprised of 30 to 35 patients (5 batches each). All the participants were told to attend the health education session on particular day depending on the feasibility of all the patients of particular batch. Such health education sessions were conducted by two doctors every week in morning hours from 10:15 am to 11:00 am. Subjects of group A were motivated to attend physical exercise sessions in addition to health education sessions. Physical exercise sessions were conducted thrice weekly from 10:00 am to 11:00 am by Trained Physiotherapists/ Occupation Therapists from the Parent Institute.

Health education sessions

In 30 minutes of one health education session following topics were covered like:

- 1) Basic information about Obesity and its associated co-morbidities.
- 2) Importance of Diet control and regular physical exercise in controlling Obesity.
- 3) Motivation of the patients to change their life style.

Personal one to one counseling

This is especially given to those who have some difficulty during health education session.

Dietary counselling

Dietary counselling was done during follow up visits at UHC with the help of dietician. In dietary counselling patients were given information about different types of foods which are harmful or beneficial in obesity and spacing of meals.

Physical exercise sessions

Each session consisted of 45-60 minutes which included Aerobics (3-4 repetitions of 10 minutes moderate pace walking), Weight training and

Stretching exercises. The intensity and duration of training schedule was increased gradually.

Over a period of 2 weeks, 5 batches were covered. Such exercise sessions were given in batches every fortnightly. So, over a period of one year each batch got at least 20 sessions. Patients were motivated to follow the exercise schedule at home for at least 4-5 days a week.

Assessment of Self-esteem of the Patient

Self-esteem analysis was done at the starting of study, midway through it and at the end by administering Rosenberg Self-esteem Scale. According to which patients were classified as having, Low (<15), Normal (15-25) and High (> 25) Self esteem.

After completion of 12 months of study period, a total of 66 subjects (36 subjects of group A and 30 of group B) who were unable to follow up, were discarded from the study and Blood pressure, BMI and Waist-Hip ratio examination was again carried out of the remaining subjects to find out the effects of health intervention.

The comparison of Quantitative variables between and within the groups was done using student's t-test, while the Qualitative data was compared using chi-square test. The Median values of self-esteem scores within the two groups and between them was compared using Wilcoxon Signed Rank test. The confidence limit for significance was fixed at 95% level with p-value < 0.05.

RESULTS

Out of 350 subjects 163 (46.57%) were males. Initially at beginning of the study, the Mean Self-esteem levels of group A and group B were 19.25 and 19.47, which changed to 22.06 and 19.23 respectively after the Intervention period. Mean systolic BP, Diastolic BP, Body Mass Index and Waist-Hip ratio was also decreased in group A subjects after Health intervention. Table 1 shows that the baseline characteristics like BMI, Waist-Hip ratio, blood pressure, Haemoglobin and Self-esteem scores of both the groups were similar and there was no significant difference between the groups before the start of the study. Table 2 reveals that, after health intervention there was a significant decline in BMI, Waist-Hip ratio and blood pressure readings in subjects of group A.

Also Self-esteem scores showed significant improvements in these subjects. While, there were no significant changes in these parameters in group B subjects. Table 3 is showing a significant Inverse association ($p < 0.001$) between BMI and Self-esteem. Table 4 depicts the trends of change in self-esteem scores of obese individuals in group A. There was a significant improvement after each

follow up and even between those follow ups, which shows the effectiveness of Intervention as a means of improving the mental health. Table 5 shows that there was a gradual decline in the self esteem of subjects of the group B over the study period, but it was very minimal and Non-significant.

Table 1: Comparison of Baseline obesity and other clinical Indicators among both groups

Parameters	Group	N	Mean	Std. Deviation	Std. Error of Mean	Un-paired t-test	p-value
BMI	A	175	26.37	2.10	0.16	1.84	0.067
	B	175	26.77	1.96	0.15		
Waist-Hip Ratio	A	175	0.89	0.16	0.01	0.05	0.96
	B	175	0.89	0.13	0.01		
Systolic B.P	A	175	128.5	12.42	0.94	1.42	0.16
	B	175	126.8	9.64	0.73		
Diastolic B.P.	A	175	83.89	10.48	0.97	1.02	0.31
	B	175	85.11	8.25	0.77		
Self esteem score	A	175	19.25	3.94	0.29	0.62	0.54
	B	175	19.47	2.89	0.21		

Table 2: Comparison of BMI, Waist-Hip Ratio, Blood Pressure, Self Esteem after 12 month follow up

Parameters	Group	N	Mean	Std. Deviation	Std. Error of Mean	Un-paired t test	p-value
BMI	A	139	24.49	1.98	0.17	10.67	< 0.01
	B	145	26.97	1.94	0.16		
Waist-Hip Ratio	A	139	0.81	0.13	0.01	7.04	< 0.01
	B	145	0.92	0.13	0.01		
Systolic B.P	A	139	125.6	10.66	0.90	0.09	0.92
	B	145	125.7	9.36	0.78		
Diastolic B.P.	A	139	83.8	7.05	0.60	2.03	0.04
	B	145	84.98	7.85	0.65		
Self esteem score	A	139	22.06	2.47	0.21	8.72	< 0.01
	B	145	19.23	2.96	0.25		

Table 3: Association between Self Esteem Score and BMI Status

Self esteem score	Body Mass Index in Kg/m ²				
		Overweight	Obesity I	Obesity II	Total
Low	N	9	39	2	50
	%	18%	78%	4%	100%
Normal	N	52	232	3	287
	%	18.11%	80.83%	1.04%	100%
High	N	9	4	0	13
	%	69.24%	30.76%	0.00%	100%
Total	N	70	275	5	350
	%	20%	78.57%	1.43%	100%

Test	Value	df	p-value	Association
Pearson Chi-Square	23.13	4	0.0001	Significant

Table 4: Comparison of Self-esteem status in Group A subjects after First & Second follow up

Rosenberg Score	Mean	SD	Percentile			Wilcoxon Signed Rank Test	P- Value	Association
			25th	50th	75th			
Baseline	19.25	3.94	16	19	23	-8.56	< 0.001	Significant
6 month	20.76	3.08	18	21	23			
6 month	20.76	3.08	18	21	23	-8.78	< 0.001	Significant
12 month	22.06	2.47	20	22	24			
Baseline	19.25	3.94	16	19	23	-9.03	< 0.001	Significant
12 month	22.06	2.47	20	22	24			

Table 5: Comparison of Self-esteem status in Group B subjects after First & Second follow up

Rosenberg Score	Mean	SD	Percentile			Wilcoxon Signed Rank Test	P- Value	Association
			25 th	50th	75 th			
Baseline	19.47	2.89	18	19	22	-0.18	0.86	Non-Significant
6 month	19.32	2.92	17	19	22			
6 month	19.32	2.92	17	19	22	-1.83	0.067	Non-Significant
12 month	19.23	2.96	17	20	22			
Baseline	19.47	2.89	18	19	22	-1.66	0.096	Non-Significant
12 month	19.23	2.96	17	20	22			

DISCUSSION

Out of 350 subjects 163 (46.57%) were males and 187 (53.43%) were females. Obesity was found to be more in the females as compared to the males in age group 40-60 years. This finding is in concordance with the Framingham, USA study [7] which states that, men were found to gain most weight between the ages of 29 and 35 years, while women gain most between 45 and 49 years of age. After using the WPRO-2000 obesity criteria, we found that 15 (8.5%) males were overweight, 148 (90.8%) were obese I while no one was suffering from morbid obesity. When we compare this with females there is not much of a difference as 55 (29.4%) were overweight, 127 (67.9%) were obese I and 5 (2.7%) were suffering from morbid obesity (Obese II) [5].

The Mean BMI and Waist-Hip ratio of the subjects who followed the dietary plan given to them and included daily exercise in their routine, showed a significant decrease (26.43 vs. 24.49) with p-value < 0.001. The study findings are in accordance with the Clinical Guidelines, published by the National Institutes of Health and National Heart, Lung and Blood Institute 1998, where extensive analysis of the efficacy of various treatments for obesity is given [8].

The blood pressure readings, both systolic and diastolic showed a significant decline over a period of one year in subjects of group A (p < 0.001). On comparing the results of intervention in our study with various studies across the globe, we found a substantial amount of evidence supporting our findings. The study done by Elley CR, Arroll B et al. stated that Regular exercise improves blood flow and helps to reduce the blood pressure [9]. High levels of obesity dents the self esteem of an individual, as shown by the findings of our study in which majority (80% and 86.67%) of the subjects with low self esteem scores were found to be obese (BMI > 25Kg/m²) while most (71.43% and 66.67%) subjects who were having high self esteem scores have BMI levels less than 25 Kg/m². Thus, the association between self esteem and BMI levels is a significant one (p-value- 0.0162 and 0.0002).

Review of various literatures showed that obesity does have a negative impact on the self esteem of

an individual, which can leads to depression [2]. In our study we found out that a substantial amount of obese subjects (20%) were suffering from low self esteem. The prevalence of low self esteem and depressive states are generally more common in females and our study is in affirmation with this fact as majority (65.71%) of subjects with low self esteem were females. On observing the trends of change in self-esteem scores of obese individuals in group A, we found that there was a significant change (p < 0.001) in the mean scores over a period of one year (19.25 vs. 20.76 vs. 22.06). There was a significant improvement after each follow up and even between those follow ups, which shows the effectiveness of intervention as a means of improving the mental health. Similar study was done by L.M. Walker, P J Gately et al [10] on obese children, and they proposed that while obese adolescents had lower self-worth and greater body dissatisfaction relative to the comparison children at the start of the camp, the intervention (exercise sessions at weight loss camp) improved their psychological state. Greater weight loss was associated with greater psychological improvement.

It has also been mentioned in various literatures that exercise improves mental health, helps prevent depression, helps to promote or maintain positive self esteem, and can even augment an individual's sex appeal or body image, which is also found to be linked with higher levels of self esteem [11]. The scientific explanation for this is that when a person exercises, levels of both circulating serotonin and endorphins (anti-depressant hormones) are increased [12]. These levels are known to stay elevated even several days after exercise is discontinued, possibly contributing to improvement in mood, increased self-esteem, and weight management [13]. Exercise alone is a potential prevention method and/or treatment for mild forms of depression [14].

CONCLUSION AND RECOMMENDATIONS

Physical exercise can play a significant role in improving the Self-esteem of obese individuals. It also helps in reducing BMI and controlling other associated co-morbidities like high blood pressure and blood sugar levels. Medical professionals

should educate patients about the importance of physical exercises and encourage them to do it.

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*Corresponding author: Dr. Hemant Mahajan

E-mail: hemant.mahajan.84@gmail.com