

The Effect of Weight Reduction on Body Mass Index, Body Fat Percent and Lean Body Mass among Male Junior National Boxing Campers

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Abstract

The aim of the study was to assess the effect of weight reduction on body mass index (BMI), body fat percent (BF %) and lean body mass (LBM). The subjects for the study were twenty four boxers, ranging in the age group between 16 – 18 years. The data was collected at the time of the training camp held at Jawahar Lal Nehru Stadium, New Delhi, India. The selected parameters such as age, body weight, standing height and skinfold measurements (Durnin and Wormsley, 1974) were taken on the day of joining the camp. The body weights of all the subjects were obtained again ten days prior to competition and one day before the competition, ONGCYMCA VIII, International Boxing Championship. For the purpose of the present study the subjects who reduced their body weight more than one percent were selected for the further study and the following parameters such as body weight, standing height their body mass index (BMI) was computed by applying Quetelet Body Mass Index method, (Collins, 1990), and body fat measurement (BF%) and lean body mass (LBM) were calculated by applying (Siri, 1965) equation. To see the effects of weight reduction on above said parameters the difference change and percent change were applied in pre and post scores of the boxers. The findings of present research were concluded that out of twenty four subjects only ten reduced body weight by -4.68 percent maximum during the camp and weight reduction indicated a gradual pattern. The result indicates that body mass index, fat percentages and lean body mass among the all boxers were reduced simultaneously.

Key Words: Weight reduction, boxers, skinfold, body mass index, body fat percentage, and lean body mass.

INTRODUCTION

In today's neck to neck competition an athlete cannot afford to take a chance in any area, as minute fraction of time can deprive him of fame and fortune. In never ending quest for winning, the athletes try to use all possible means, which promises to improve their performances. Boxing competition are organised according to weight class, so, it has been seen that making weight is common problem among boxers and other weight category sportsperson. Patterns of weight loss vary among boxers. Some athletes chronically maintain a low body weight, whereas others lose weight for the competitive season and regain in the off-season. Prior to the competition, weighing takes place to ensure that the athlete pitted firmly against the opponent of their weight class. There is typical example of weight bands for a light fly weight boxer. Competition weight – 48 Kg, Training weight – 48 to 51 Kg, Living Weight – 51 to 52 Kg (Beans, A. N. and Wallington, P. 1996).

Most athletes participating in combat sports with specific body mass categories such as wrestling, boxing and judo can compete in a class 10% below their usual body mass (Brownell, Steen, & Wilmore, 1987). Thus body mass control may be as important an issue as performance (Fox, 1993). Induced rapid weight cutting through dehydration results

vomiting, use laxatives, diuretics, or sauna (Horswill, C.A. 1993; Kiningham, R.B. and Gorenflo, D.B. 2001; Oppliger, R.A. et al. 1996). These practices may have negative consequences on mood, health and performance of athletes (Fogelholm, M. 1994; Hall, C.J. and Lane, A.M. 2001; Webster, S., Rutt, R. and Weltman, A. 1990), mostly due to inadequate fluid replacement in the period between weigh-in and competition. Athletes in weight class sports believe that weight loss is a necessary part of the sport, and few question the weight loss method used (Hall & Lane 2001; Marquart & Sobal, 1994).

Problem of the Statement

From the above discussion the following problem “The Effect of Weight Reduction on Body Mass Index, Body Fat Percent and Lean Body Mass among Male Junior National Boxing Campers” has been taken under consideration for the present study.

PARTICIPANTS AND PROCEDURE

The data were obtained from all the ten boxers who represented ONGC YMCA VIII, International Boxing Championship, have been assessed at the time of their Junior National camp at JawaharLal Nehru Stadium, New Delhi, India. The purposively sampling was employed to selected subjects. The average age of the subjects were 17 years. The research scholar has not given treatment as it was given under the controlled supervision of Indian Coaches and Specialists in Sports Sciences appointed by the Sports Authority of India in consultation with the Boxing Federation of India.

The data was collected on all the selected parameters from the selected subjects who were undergoing intensive training towards the preparation of ONGC YMCA VIII, International Boxing Championship, in phase 1st, the body weight, standing height and skinfolds measurements were taken, that were considered as pre data. The subjects were bare footed and wearing minimal positive cloths. Before weighing, the subjects were asked to void their bladders, body weight was measured with an electronic weighting scale (DS-415 Series, Essaeteraoka Limited, 0.300 Kg) to the nearest of 0.1 kg, and height with an anthropometric rod measured to the nearest of 0.1 cm. The Body mass index (BMI) was determined as the Quetelet Index ($\text{Kg} \cdot \text{m}^{-2}$). The skinfold thickness was measured at four sites (biceps, triceps, subscapular, suprailliac) by using a skinfold calliper (Laffettee) to the nearest of 0.2 mm (Durnin and Wormsley, 1974). In second stage, the subjects were weighed again ten days prior to the competition. In third stage, the subjects who reduced their body weight more than one percent were selected for the further study and the above said parameters were taken again one day before competition. Body mass index (BMI) was calculated by applying Quetelet Body Mass Index (Collins, 1990), where Body Fat percentage (BF %) and lean body mass (LBM) were calculated using the equations as suggested by Durnin and Wormsley (1974), as devised by Siri (1965) as given below:

Body Mass Index (BMI):

Body Mass Index (BMI) is calculated by the following formula given by Quetelet Body Mass Index (Collins, 1990; Verma, and Mokha, 1994; Kansal, 1996 and 2008) respectively.

$$\text{BMI} = (\text{Kg} \cdot \text{m}^{-2}) \text{ or } \text{mass (Kg)} / [\text{Height (m)}]^2$$

Calculation of body density

Body density was calculated by using the following equation given by *Durnin and Wormsley, 1974*.

$$\text{Body Density} = 1.1620 - 0.0630 \log (\text{Biceps} + \text{Triceps} + \text{Subscapular} + \text{Suprailliac})$$

The percent of body fat was calculated from the body density by using the following equation devised by *Siri, 1965*.

$$\text{Percent of body fat} = 4.95 / \text{Body density} - 4.50 * 100$$

RESULTS AND DISCUSSION

Table No. 1: Descriptive Analysis of Pre and Post Data of Body Weight, Body Mass Index, Body Fat % and Lean Body Mass among Male Junior National Boxers those who Reduced their Body Weight

Subjects	Body Weight (BW)		Body Mass Index (BMI)		Body Fat % (BF %)		Lean Body Mass (LBM)	
	Pre Data	Post Data	Pre Data	Post Data	Pre Data	Post Data	Pre Data	Post Data
Balbir	51.20	48.05	20.50	18.30	17.86	16.54	82.12	83.46
O'Biten Singh	52.30	51.00	19.90	19.40	19.19	18.3	80.81	81.70
Manoj Kumar	52.40	51.05	19.50	19.00	11.15	15.66	88.25	84.34
L.Sanjay Kumar	55.40	54.00	18.90	18.50	12.18	10.46	87.82	89.54
Jai Bhagwan	60.40	57.02	19.50	18.40	16.10	15.66	83.90	84.34
Kapil	61.00	57.00	19.90	18.60	16.10	21.42	83.90	78.58
S.Prem Kumar	62.00	60.00	20.70	20.00	18.30	20.98	81.70	79.02
Sawan Kumar	65.00	62.00	23.00	22.00	13.91	17.42	86.09	82.58
Ajit Singh	66.00	60.00	21.10	19.20	14.78	14.35	85.22	85.65
Naveen	76.50	74.00	23.60	22.80	15.22	12.61	84.78	87.39

The descriptive analysis of body weight, body mass index (BMI), body fat percentage (BF %) and lean body mass (LBM) of ten boxers who had reduced their body weights is being presented in **table no. 1(a)**, and show that the body weight of Balbir, O'Biten Singh, Manoj Kumar, L. Sanjay Kumar, Jai Bhagwan, Kapil, S. Prem Kumar, Sawan Kumar, Ajit Singh, and Naveen were 51.20 kg, 52.30 kg, 52.40 kg, 55.40 kg, 60.40 kg, 61.00 kg, 62.00 kg, 65.00 kg, 66.00 kg, and 76.50 kg, respectively, these readings were taken on the day of joining the camp, however, the mandatory competition body weight for the ten boxers were ranging from 46.00 - 48.00 kg, 48.00 - 51.00 kg, 51.00 - 54.00 kg, 54.00 - 57.00 kg, 57.00 - 60.00 kg, 60.00 - 64.00 kg, 69.00 - 75.00 kg respectively. The bar diagram representation has been shown in figure no. 1a.

The significant reduction in body weight to a desirable competition body weight in the post data (one day before the competition ONGC, YMCA, VIII, International Boxing Championship) 48.05 kg, 51.00 kg, 51.05 kg, 54.00 kg, 57.02 kg, 57.00 kg, 60.00 kg, 62.00 kg, 60.00 kg, and 74.00 kg respectively.

Table no. 1 (b): represents the body mass index (BMI) among the ten boxers in the pre and post data were found to be 20.50 and 18.30, 19.90 and 19.40, 19.50 and 19.00, 18.90 and 18.50, 19.50 and 18.40, 19.90 and 18.60, 20.70 and 20.00, 23.00 and 22.00, 21.10 and 19.20, 23.60 and 22.80 respectively. The bar diagram representation has been shown in figure no. 1b.

Table no. 1 (c): indicates the body fat percentage (BF %) among the ten boxers in the pre and post data were found to be 17.86 and 16.54, 19.19 and 18.3, 11.15 and 15.66, 12.18 and 10.46, 16.10 and 15.66, 16.10 and 21.42, 18.30 and 20.98, 13.91 and 17.42, 14.78 and 14.35,

15.22 and 12.61 respectively. The bar diagram representation has been shown in figure no. 1c.

Table no. 1 (d): illustrates the lean body mass (LBM) among the ten boxers in the pre and post data were found to be 82.12 and 83.46, 80.81 and 81.7, 88.25 and 84.34, 87.82 and 89.54, 83.90 and 84.34, 83.90 and 78.58, 81.70 and 79.02, 86.09 and 82.58, 85.22 and 85.65, 84.78 and 87.39 respectively. The bar diagram representation has been shown in figure no. 1d.

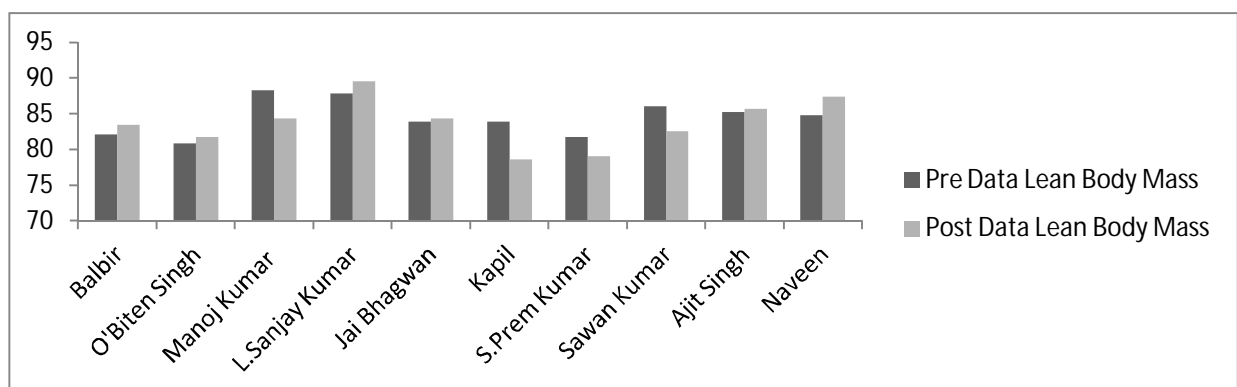
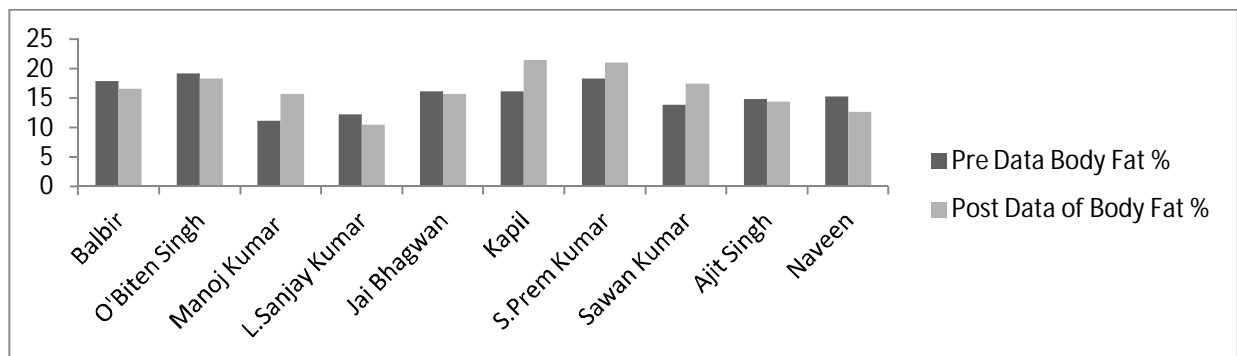
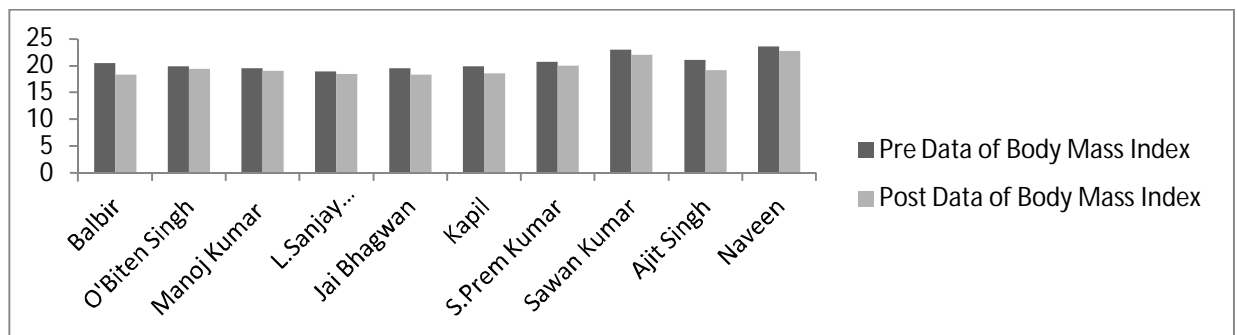
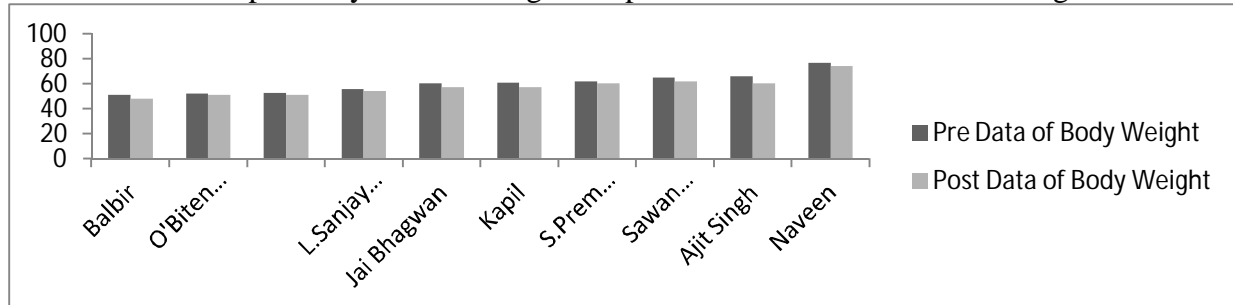


Figure 1a: Descriptive Analysis of Pre and Post Data of Body Weight among Male Junior National Boxers those who reduced their Body Weight

Figure 1b: Descriptive Analysis of Pre and Post Data of Body Mass Index (BMI) among Male Junior National Boxers those who reduced their Body Weight

Figure 1c: Descriptive Analysis of Pre and Post Data of Body Fat % (BF %) among Male Junior National Boxers those who reduced their Body Weight

Figure 1d: Descriptive Analysis of Pre and Post Data of Lean Body Mass (LBM) among Male Junior National Boxers those who reduced their Body Weight

Table No. 2: Mean of Pre and Post Data of Body Weight, Body Mass Index, Body Fat % and Lean Body Mass among Male Junior National Boxing Campers those who Reduced their Body Weight during the Camp

Parameters	Mean of Pre Data	Mean of Post Data
Body Weight	60.23	57.41
Body Mass Index	22.66	19.62
Fat Percentage	16.02	16.34
Lean Body Mass Percentage	83.97	83.66

The mean of pre data of body weight, body mass index (BMI), body fat percentage (BF %) and lean body mass (LBM) of the boxers who had reduced their body weights during the camp is being presented in table no. 2, and shows that the mean of body weight, body mass index (BMI), fat percentage (BF %), and lean body mass (LBM) of all the ten boxers 60.23, 22.66, 16.02, and 83.97 respectively, these readings were taken on the day of joining the camp. The mean of post data of above said parameters were 57.41, 19.62, 16.34, and 83.66, taken one day before their participation in the competition respectively.

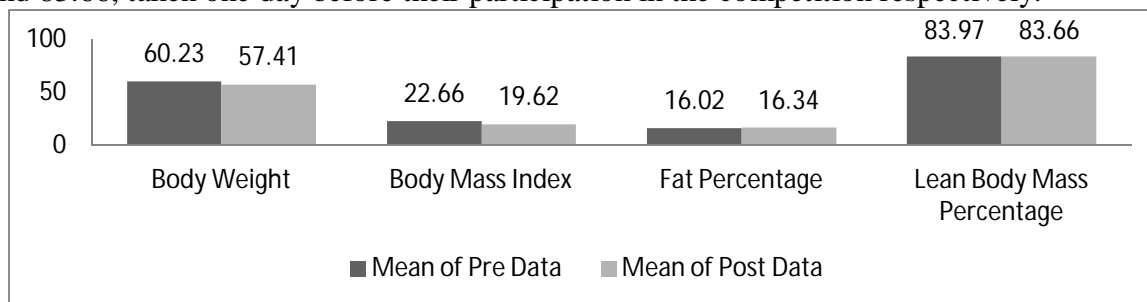


Figure No. 2: Mean of Pre and Post Data of Body Weight, Body Mass Index, Body Fat % and Lean Body Mass among Male Junior National Boxing Campers those who Reduced their Body Weight during the Camp

Table No. 3: Standard Deviation of Pre and Post Data of Body Weight, Body Mass Index, Body Fat % and Lean Body Mass among Male Junior National Boxing Campers those who Reduced their Body Weight during the Camp

Parameters	Pre Data of SD	Post Data of SD
Body Weight	7.85	7.38
Body Mass Index	1.53	1.56
Fat Percentage	3.87	3.43
Lean Body Mass Percentage	3.84	3.43

Table no. 3 shows the standard deviation of pre and post data of all ten boxers those who reduced their body weight during the camp, which indicates that the SD value of body weight (BW), body mass index (BMI), body fat percentage (BF %) and lean body mass (LBM) was found to be 7.85 ± 7.38 , 3.87 ± 3.43 , 3.84 ± 3.43 , and 1.53 ± 1.56 respectively. The bar diagram presentation has been shown in figure no. 3

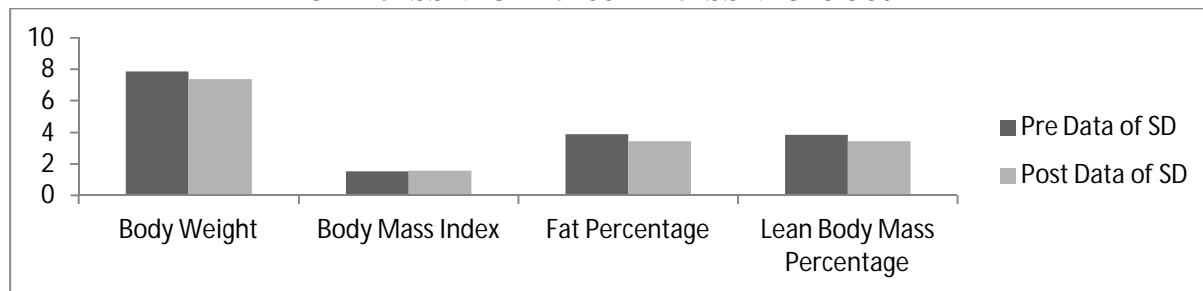


Figure 3: Standard Deviation of Pre and Post Data of Body Weight, Body Mass Index, Body Fat % and Lean Body Mass among Male Junior National Boxing Camper those who Reduced their Body Weight during the Camp

Discussion of Findings

In Indian Boxers the findings of the study are in line with the findings of Wideman and Hagan (1982) concluded that a wrestler can go under a weight loss approximately 8% and still maintain a high level of muscular strength and maximal aerobic power. A wrestler or other weight category sports person can get the benefit of being bigger, stronger and faster in the lower weight category by successful reducing weight by scientific method. The men having more than 25 percent of body fat are considered as obese and those between 20 – 25 percent are considered as obese (WillmoreCostill, 1994). Two subjects as per present study were found to be as borderline obese. In one of the other findings of Kelly and Wickkister (1975), suggested a typical ideal fat percentage of 5 to 7 percent for the wrestlers. Bhardawaj et.al, (1990) and Guidetti et.al (2002) in their separate studies conducted on male boxers observed the mean fat values of 10.4 percentage and 14.5 percentages respectively. In case of reduction found in body fat percentage (BF %) may be due to the intensive training and food restrictions given to the subjects for the preparation International Championship. Whereas there is a reduction found in body mass index (BMI) which may be caused due to training in the training camp. There was a decrease in lean body mass (LBM), as they were preparing for the ONGC YMCA VIII, International Boxing Championship which is one of the good competitions of sports in the world, they were regular in the different types of training such as strength, speed, and explosive etc. which might have resulted decrease in lean body mass (LBM). Decrease in lean body mass has a negative relationship with muscular strength.

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