



CORRELATION OF LEPTIN LEVEL WITH OBESITY.

1. MBBS, M.Phil
Assistant Professor Physiology
CMH Institute of Medical Sciences
Bahawalpur.
2. MBBS, M.Phil
Assistant Professor Physiology
Sharif Medical and Dental College
Lahore.
3. M.Sc. (IT), M.Phil. (Computer
Sciences)
Assistant Professor Computer
Science
Sharif College of Nursing Lahore.

Correspondence Address:

Dr. Jazib Andleeb
Assistant Professor Physiology
CMH Institute of Medical Sciences
Bahawalpur.
jazibsaqlain@gmail.com

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Jazib Andleeb¹, Sana Javaid², Rukhsana Abdul Karim³

ABSTRACT... Objectives: To document the leptin level and its effect on obese and non-obese. **Study Design:** Observational comparative study. **Setting:** CMH Institute of Medical Sciences Bahawalpur, Sharif Medical and Dental College and Sharif College of Nursing Lahore. **Period:** From 1st January 2018 to 1st January 2019. **Material & Methods:** Ninety healthy obese and non-obese subjects who were selected by non-probability consecutive sampling technique included in study. Ethical approval was obtained before start of study. SPSS version 23 was used for data analysis; main variables of study were age, BMI and leptin resistance. P value ≤ 0.05 was considered as significant. **Results:** The mean leptin level in obese and non-obese was 53.75 ± 7.54 and 50.62 ± 7.18 , respectively. There difference was statistically significant among the groups, ($p=0.000$). **Conclusion:** Results of our study reveal that leptin level is a related factor in the pathogenesis of obesity.

Key words: Epigenetic Landscape, Leptin, Obesity, Weight.

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INTRODUCTION

Leptin is a hormone protein that plays an important role in regulation of body weight and metabolism.¹ Leptin was discovered in 1994 and give too much attention in the field of metabolic research and Obesity. Obesity is an excessive amount of body fat which produces adverse health consequences worldwide.² The traumatic increase in frequency of obesity has been observed; about 60 to 65% are overweight or obese now. Main cause of the obesity is energy homeostasis that means a balance between energy intake, energy expenditure and storage. According to the 2016 World Health Organization (WHO) statistics, 20.8% of the population is overweight and 4.8% is obese.³

An increase, decrease and maintenance of body weight related to the balance between energy intake and expenditure.⁴ The energy intake means the use of food in 24 hours and energy expenditure is a complex thermo genesis process which is a combination of adoptive thermo genesis, basal metabolism and daily physical activities.⁵

Among these adoptive thermo genesis is an increase production of heat due to metabolic cycles running in human body in response of behavioral and environmental changes which may include consumption of excessive food, composition of diet and number of pathogenic stimuli.^{6,7} Leptin secreted by adipocytes direct into the blood stream and present in serum. Its primary role is to provide signals to the central nervous system about energy store and command the human body to make adjustment about the energy intake and expenditure.⁸

Main role of leptin is to act as a gate keeper to activity which is essential and necessary for the survival and reproduction.⁹ Leptin controls food intake by binding to the receptors in central nervous system and modulator for the activities of neuron to control the appetite and use of food. Sometimes obese develop very high plasma leptin concentrations and fails to reduce appetite or enhance the energy expenditure.¹⁰ This study was unique analysis at our setup as no local study available before in this region that trends towards research and problem solving step of obesity.

MATERIAL & METHODS

This observational comparative study was conducted at CMH Institute of Medical Sciences Bahawalpur, Sharif Medical and Dental College and Sharif College of Nursing Lahore from January 2018 to January 2019. The study was conducted on 90 healthy obese and non-obese subjects who were selected by non-probability consecutive sampling technique. Patients with BMI of 23 to 27kg/m² were labeled as overweight.¹¹ 27 to 40kg/m² were labeled as obese. 18 to 23kg/m² we're labeled as non-obese.¹¹ The study was started after the ethical approval from the ethical board of hospital after detailed information to the participating subjects. Laboratory and clinical data was collected from all subjects to present as outdoor department of hospital. Sample size calculated by using online software openepi.com.

Height of the patients was measured by using stadiometer and weight was calculated by weighing weight balance. BMI was calculated by using formula weight in kgs over height in m². After an overnight fasting blood samples were obtained in morning time and blood was saved into a plane tube and left for clotting at room temperature. After 20 minutes of sample collecting blood was centrifuged for 10 minutes at the speed of 2000 to 3000G and serum was collected for leptin analysis. Sandwich enzyme linked immunosorbent assay (Elisa) was used for determination for leptin. Obese patients according to standard definition of obesity were included in the study. Patients with chronic or systemic illness (liver cirrhosis, renal failure, and cardiac diseases), hypertension, diabetes, depression and pregnant women were excluded from the study .

Statistical analysis of data was performed by using SPSS version 23. Mean and standard deviation we're calculated for numbers like age and leptin range level. Frequency and percentage were calculated for data analysis of qualitative variables. T-test and chi square tests were applied to see association among variables. P value less than or equal to 0.05 was considered as significant.

RESULTS

Ninety patients were included in this study, both gender. The patients were divided into two groups as obese and non-obese. The mean age and BMI of the obese patients was 35.06±4.11 years and 31.71±2.28 kg/m², respectively. There were n=30 (66.7%) males and n=15 (33.3%) females. While, the mean age and BMI of the non-obese patients was 30.11±3.55 years and 21.48±1.71 kg/m², respectively. There were n=34 (75.6%) males and n=11 (24.4%) females. The differences were statistically significant except gender (p=0.352). (Table-I).

The mean leptin level in obese and non-obese was 53.75±7.54 and 50.62±7.18, respectively. There difference was statistically significant among the groups, (p=0.000). (Table-II).

Variable	Obese n=45	Non-obese n=45	P-Value
Age (years)	35.06±4.11	30.11±3.55	0.001
BMI (kg/m ²)	31.71±2.28	21.48±1.71	0.001
Gender			
Male	n=30 (66.7%)	n=34 (75.6%)	0.352
Female	n=15 (33.3%)	n=11 (24.4%)	

Table-I. Demographic characteristics of both groups.

Variable	Obese n=45	Non-obese n=45	P-Value
Leptin level	53.75±7.54	48.21±7.18	0.001

Table-II. Leptin level in obese and non-obese patients.

DISCUSSION

In our study we found raised leptin level in obese patients as compare to non-obese which means that leptin resistance is the prominent cause of obesity in humans. In a previous study conducted by Lönnqvist F et al¹² also reported similar effect, he conducted a study on patients of cardiovascular patients and concluded that leptin level was found elevated in obese presented with cardiovascular events. In his study this level was not found increased in non-obese cardiac patients.

In another study conducted by Smith JD et al¹³ found that leptin level was not found in obese

patients who were aged over 65 years. Results of this study shows that leptin level highly bounded to age of patients, increase in age reduce that patient's leptin. A study was conducted by Ostlund et al¹⁴ and concluded that patients with age limit above 65 years have negative correlations between leptin and body weight. Below 65 years patients have raised level of leptin as compare to above 65 years. A decrease in leptin levels originates by adipose tissue may be responsible for this difference.

In contrast to two studies given above many studies prove positive correlation between age and leptin level. As a study was conducted by Shamsuzzaman AS et al¹⁵ on Independent association between plasma leptin and C-reactive protein in healthy humans and found positive correlations among two variables.

Stagier H et al¹⁶ conducted a study and reported positive correlation between leptin resistance and hip waist ratio (HWR), body mass index as our study also found positive correlation with body mass index (BMI). On other hand Liuzzi A et al¹⁷ reported negative correlation with leptin resistance and HWR. In his study positive correlation was found in male subjects and negative correlation was observed in female.

Another similar study was conducted by Lyoussi B et al¹⁸ and observed that positive correlation was present in male subjects and negative correlation was found in female subjects. This study also favors the study of Liuzzi A et al¹⁹, gender-related difference may be due to visceral fat tissue in males and greater abundance of subcutaneous fat tissue in females subjects.

Scarpace PJ et al¹⁹ conducted a study on relation of obesity and leptin elevation and observed strong correlation between both. He reported that once leptin resistance takes control of body mechanism every high density food will results extensive weight gain. As related to its prevention treatment of leptin resistance in childhood will confers exposure protection from obesogenic food and environment.^{20,21}

CONCLUSION

Leptin level is a related factor in the pathogenesis of obesity, further more among different diseases increased leptin level is responsible significantly.



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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Jazib Andleeb	Conceive idea, Design study.	
2	Sana Javaid	Manuscript Writing.	
3	Rukhsana Abdul Karim	Data Collection, Data Analysis.	