



**REGULAR PHYSICAL ACTIVITIES MAINTAINED THE HORMONAL IMBALANCE
AMONG THE FEMALE
SPORTS PERSONS (SPECIFIC REFERENCE TO HORMONES - INSULIN & CORTISOL)**

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INTRODUCTION

Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness. It is performed for various reasons including strengthening muscles and the cardiovascular system, frequent and regular physical exercise boosts the immune systems and helps prevent the "disease of affluence" such as heart disease, cardiovascular disease, type-2 diabetes and obesity. It also improves mental health, helps prevent depression, and helps to promote or maintain positive self esteem, and even augment an individual sex appeal or body image. Childhood obesity is a growing global concern which is also a cause of abnormal hormone production.

Physical exercise may help to decrease some of the effects of childhood and adult obesity. Health care providers often call exercise the "miracle" or "wonder" drug - eluding to the wide variety of proven benefits that it provides.

Hormones imbalance can destroy health, looks, and when available in proper proportions, can keep young, healthy and cheerful. Hormones determine the "flight on fight" response of body. They help manage excessive stress and they keep depression and the related diseases away.

Physical activities/exercise is often recommended as a means of improving motor skills, fitness, muscle and bone strength, and joint function. Exercise has several effects upon muscles, connective tissue, bone, and the nerves that stimulate the muscles. One such effect is muscle hypertrophy, an increase in size. This is used in bodybuilding.

HORMONE INSULIN

Insulin is a natural hormone made by the pancreas that controls the level of the sugar glucose in the blood. Insulin permits cells to use glucose for energy. Cells cannot utilize glucose without insulin.

The failure to make insulin or to respond to it constitutes diabetes mellitus. Insulin is made specifically by the beta cells in the islets of Langerhans in the pancreas. If the beta cells degenerate so the body cannot make enough insulin on its own, type I diabetes results. A person with this type of diabetes must inject exogenous insulin (insulin from sources outside the body).

In type II diabetes, the beta cells produce insulin, but cells throughout the body do not respond normally to it. Nevertheless, insulin also may be used in type II diabetes to help overcome the resistance of cells to insulin.

By reducing the concentration of glucose in the blood, insulin is thought to prevent or reduce the long-term complications of diabetes, including damage to the blood vessels, eyes, kidneys, and nerves.

History of Insulin: In 1921, Frederick Grant Banting and Charles H. Best discovered insulin while they were working in the laboratory of John J.R. Macleod at the University of Toronto. Banting and Best extracted material from the pancreas of dogs. They first used this material to keep diabetic dogs alive and in 1922 they used it successfully on a 14-year-old boy with diabetes. In 1923, James B. Collip, a biochemist, discovered that purifying the extract prevented many of the side effects.

In 1923, Banting and Macleod were awarded the Nobel Prize. Best and Collip were overlooked but Banting and Macleod shared the prize money with them. The US Food and Drug Administration (FDA) first approved insulin in 1939.

Insulin was the first hormone to be synthesized completely in the laboratory, a feat accomplished in 1966 by the American worker Michael Katsoyannis and scientists in China. The first recombinant human insulin was approved by the FDA in 1982.

Types of Insulin: Currently, insulin is derived from recombinant (human) sources. Regular (rapid onset, short-acting) and NPH (slower onset, longer duration) human insulin are the most commonly-used preparations. An ultra-rapid-acting insulin analog, insulin lispro injection (Humalog(r)) is a chemically-modified, natural insulin. It was approved by the FDA in June, 1996.

Insulin is administered by injection via the subcutaneous (under the skin) route. Regular insulin acts within 30 minutes, and its effects last 6 to 8 hours. The maximal effect occurs 1 to 3 hours following the injection.

HORMONE CORTISOL

Cortisol belongs to a group of hormones called glucocorticoids. As a group, these hormones are involved in the regulation of metabolism in the cells and they also help us regulate stress within the body. Cortisol is a steroid based hormone and is synthesized from cholesterol. Cortisol is made in the adrenal cortex of the adrenal gland.

Cortisol, like all steroid based hormones, is a powerful chemical. Steroid based hormones have a common mechanism of action in that they enter cells and modify the gene activity in the DNA. The amount of cortisol in your body is driven by the amount of stress you are experiencing. In addition, caffeine consumption, your eating patterns, how much physical activity you get and your sleep patterns all affect how much cortisol is released in your system. As a general rule, your highest level of cortisol occurs just after you get up in the morning and the lowest level is in the evening as you are falling asleep.

Cortisol's main function is to save us when we are under stress. Cortisol does this by provoking the cell to manufacture glucose from proteins and fatty acids. This process is known as gluconeogenesis. What cortisol is doing is saving glucose for the brain and forcing the body to use fatty acids from stored fat as energy.

Cortisol also forces the breakdown of stored proteins into amino acids so that the body can use them for making enzymes or repairing cells. Cortisol increases blood pressure which increases blood flow and distributes the glucose and other nutrients as quickly as possible to the cells. Finally, cortisol helps the body manage and respond to stress. It reduces the inflammatory response as well as the overall immune response in the body. Consequently, stress causes a rise in the amounts of glucose, fatty acids, and amino acids in the blood all promoted by cortisol. This latter effect is used to control many inflammatory diseases in the body such as rashes and allergies (hydrocortisone cream) as well as more serious autoimmune conditions like rheumatoid arthritis (cortisone injections).

Hyposecretion (deficiency) of cortisol can result from damage to the adrenal glands. This damage can cause Addison's disease. Persons affected by Addison's disease have low glucose and sodium levels in their blood, increased potassium, and they tend to lose weight. This can also cause low blood pressure and dehydration. Cortisol deficiency is usually treated with corticosteroid replacement therapy to return cortisol to normal levels in the body.

As mentioned above, hypersecretion (excess) of cortisol in response to stress results in decreased inflammation and immune response. However, there is a more serious condition called Cushing's Syndrome/Disease that can cause hypersecretion of cortisol. Instead of stress, the cause of Cushing's syndrome is either a tumor of the pituitary gland or adrenal cortex or excess doses of glucocorticoid drugs.

Accumulated daily physical activity is a major determinant of insulin sensitivity. Time spent sedentary, time spent in light-activity, and bouts of moderate or vigorous activity did not impact insulin sensitivity independently of total activity. Physical activity is now recognized as a major component of type 2 diabetes prevention; cohort studies have documented the lower risk of incident diabetes even for everyday activities such as walking. In a post hoc analysis of the Finnish Diabetes Prevention Study, walking for exercise for at least 2.5 h a week in comparison with less than 1 h was associated with a 63–69% lower risk of incident diabetes. Physical activity is a complex behavior characterized by intensity, duration, and frequency. Various consensus groups recommend physically active lifestyles for adults, with an accumulation of at least 30 min of moderate-intensity aerobic physical activity 5 or more days a week or vigorous-intensity aerobic physical activity for at least 20 min 3 days a week. Another important dimension is the time spent in sedentary occupations: in the Nurses Health Study, the number of hours spent sedentary was related with incident diabetes even after adjusting for total physical activity.

Volleyball did not lead to enhanced bone turnover markers and anabolic hormones of bone after a low-training level when compared to controls.

Indeed, a high-training level induces enhanced bone formation markers and basal concentration of anabolic (GH, IGF-1, and IGFBP-3) and catabolic (cortisol) hormones of bone metabolism. Therefore, basal hormone concentrations and bone formation markers were directly related to the intensity and the duration of the training level. Bone turnover can be viewed as the net product of two counteracting metabolic processes, bone formation and bone resorption. The balance between osteoblastic activity of bone formation and osteoblastic activity of bone resorption depends on age, nutrition, and physical activity. Physical exercise is a known source of bone turnover and is recommended for preventing bone metabolism problems.

STATEMENT OF PROBLEM

The purpose of the study is to find the significance of physical exercise and to establish the fact that the regular physical activities maintain the hormonal imbalance among the female sports persons.

OBJECTIVES

The following are objectives of Study

1. To study in detail of various hormones produced and its functioning in normal way when a female is put in regular practice of volleyball.
2. To study the level of various hormonal profile recommended from Blood serum, saliva sample of female volleyball player.
3. To study the role of volleyball game in female in stimulation of varieties of hormones including sex hormones.
4. To study hormones produced and its role in female as a cause of volleyball.

HYPOTHESIS

The Hypothesis set for the study are:

1. To assess the significance in regulation and maintenance of hormone.
2. Volleyball is a very vigorous, instant exaggerating outdoor game which causes contraction and relaxation of target organs to produce its specific hormones easily in a controlled way.
3. Volleyball stimulates organs like adrenalin to release emergency hormones in times of need to carry out required activities.
5. Insulin and Cortisol hormone produced in female is about little greater and about 0.5 mg/day is maintained regularly.

The Setting

Keeping major objectives of the study in view, appropriate design is adopted. The study was conducted on females actively involved in physical activity like volleyball game for daily 45 minutes for 28 days.

Sample was collected from Gulbarga and nearby places. The criterion of selection was participation of sportive females of fertile age group.

Thus the sample selected was designed on variables like hormone insulin and cortisol.

The sample so selected was administered the scales, viz., physical activity, physical movements during volleyball game. This is done to examine the impact of above said on female volleyball player.

Study focus mainly in terms of production and regulation of various hormones on parameter such Estrogen, Progesterone, Insulin, Cortisol, Differential impact on various hormones at specific level has been observed.

The tools used in these various level of measurement include strength, speed, Endurance, agility, flexibility.

TOOLS

It includes Strength, Speed, Endurance, Agility and Flexibility. It also includes various hormones.

1. Strength: Strength is a conditional ability i.e. it depends largely on the energy liberation process in the muscles strength is also perhaps the most important motor ability in sports. Strength is the ability to overcome the resistance or act against resistance.

2. Speed: Speed wise strength and endurance is a conditional ability it has a complex nature as it depends to a considerable extent on the central nervous system. It is the performance prerequisite to do motor actions under given conditions in minimum of time. Speed is the rate of movement of action especially distance traveled per unit of time.

Speed may be defined as the capacity of the individual to perform successive movements of the same pattern at a fast rate. We may use measure reviewing speed of a person with a watch and the distance is in meters.

3. Endurance: Endurance is the result of physiological capacity of the individual to sustain movement over a period of time. The capacity to keep going or put up with physical hardship etc for a long time. The ability to withstand physical hardship or strain.

Endurance like strength is conditional ability. Energy liberation processor primarily determines it. The ability of the human body to maintain a certain level of energy production forms the physiological basis of endurance.

4. Agility: The ability to change the position of the body in a pace rapidly and accurately without loss of balance. Agility is important in the sports where the obstacles or opponents have to be avoided it is recognized as a basic component of motor performance, but exact nature has not been determined.

5. Flexibility: Flexibility is the cog round which mobility and agility rotate. It is the ability of subject to move body joints to a maximum range of motion without strain or stress on muscles, tendons, ligaments and other joint structures. Flexibility may be visualized as looseness and

suppleness of the body joints. Increased flexibility permits a greater range of movement and this assists in minimizing injuries to muscles, tendons and ligaments.

Accelerometer (Molecular Profiling)

1. Hormonal Profile

Hormonal profile required analyzed parameters like

(a) Cortisol:

The level will be in peak in the morning and zero at evening.

(b) Insulin:

It is fundamental to keep the level within the limits to favors sliming and to prevent the onset of type II diabetes mellitus.

Data Analysis:

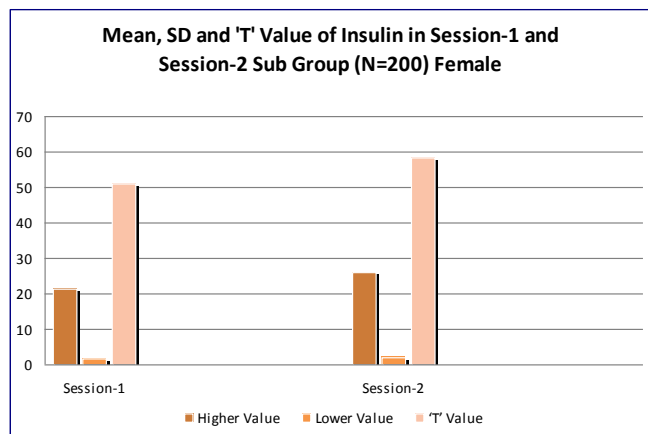
Mean, SD and t-value of **INSULIN** in Session-1 and Session-2 Sub Group (N=200) female

Sessions		Higher Value	Lower Value	t-value
Session-1	Mean : 10.92 SD : ± 3.021	21.30	1.70	51.124*
Session-2	Mean : 12.34 SD : ± 3.012	26.12	1.93	58.321**

*Significant at 0.01 level

**Significant at 0.05 level

It is observed that the mean score of in higher insulin range is 21.30 and that of Session-1 females. The t-value 51.124 is significant at 0.01 level. This clearly indicates that there significant physical activity / Excessive / volleyball game movements differences. Thus physical activity boost up the gonad activity which then causes stimulation like for day 15-days. Thus similarly the significant higher scores females in lower level range then females of session 1 as the t-value in this category is significant. There are also significant differences between higher and lower range Insulin with the simple fertile age group. Therefore it is found that Insulin is a brought in normal range or in slightly higher range if it is been produced in response to stimulus of physical activity of 45 minutes in volleyball game the same result are presented in Graph.



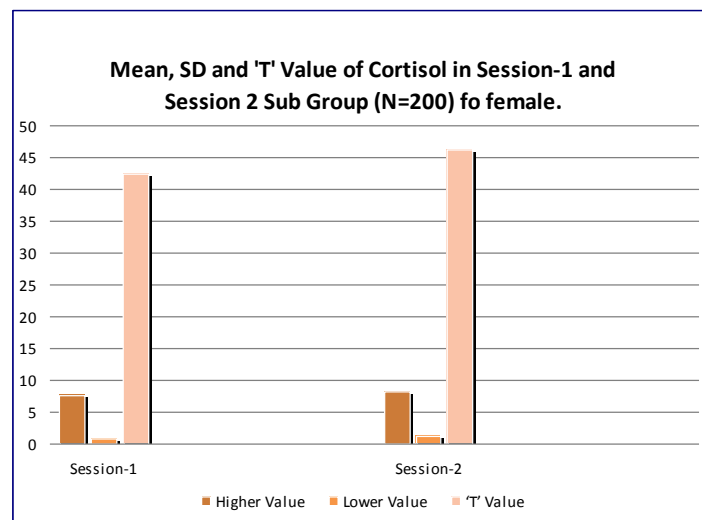
Mean SD and t-value of **CORTISOL** in session 1 and session 2 sub group (N=200) of fertile female.

Sessions		Higher Value	Lower Value	t-value
Session-1	Mean : 3.374 SD : ± 1.124	7.60	0.90	42.44*
Session-2	Mean : 4.153 SD : ± 1.184	8.15	1.20	46.15**

*Significant at 0.01 level

**Significant at 0.05 level

It can be seen through Table, that both Session-1 females (N=100) are classified as belonging to the category of high Cortisol range and low Cortisol range concept. This is done based on the norms of the standard reference range which clearly explains that one who scores within the range of 2-5 microgram (mgm) nearly more above the minimum range are classified as belonging to high Cortisol while the one who scores below the 2 mgm range are called low Cortisol range concept category. Again the t-value (46.15) is significant at 0.01 levels. Thus it is clear that there are significant differences in between the two categories of Cortisol. Thus the Session-2 female fertile respondents have more organized Cortisol range, which still more above the average range this is mainly due to the regular physical movement that are involved in 45 minutes daily from day 15 to day 18 in playing volley ball game. This is true in case of lower Cortisol category also where in the individual response towards physical activity is found to be low in session subgroup. Further, there are also significant differences between high and low Cortisol concepts in Session-2 as well as Session-1 sub group as the t-values are significant beyond levels. This clearly speaks that there are prominent differences in the individual fertile female towards physical activity in terms of Session-1 and Session-2.



CONCLUSIONS

The following are the major finding of the present study.

1. Insulin and Cortisol were also seen to be expressed in average, with the normality and to the physical exercise in volleyball game.
2. The fertile females have more degree of positive response towards the physical exercise that occurs during volleyball.
3. The fertile female are still grouped in early fertile female and late fertile female. Early fertile female exhibit quick and normal range of reference values as compared to late fertile female volleyball player.
4. Speed, agility, strength, flexibility and endurance plays an important role during movements in physical exercise.
5. The respondents of early fertile age group shows higher response ingratiation and regulation of estrange hormone in normal reference range.
6. There is significant difference between two sub groups of Insulin in physical exercise (volleyball). High Insulin respondents have showed significantly higher range of reference values on all the sessions, than those of lower Insulin range group.

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