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Original Research Paper

Evaluation of lipids and fasting blood sugar in the individuals affected with psoriasis

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ABSTRACT:

Background: The authors have considered inflammation as a factor in psoriasis by making the assumption that a physiological concentration level of lipids and fasting blood sugar (FBS) will alter the level of inflammatory markers that are responsible for the progression of psoriasis disease. **Aim**: The aim of the present study is to compare and correlate the association of lipids and FBS in the individuals affected with psoriasis and the non-psoriasis controls. **Materials & methods**: The current study included a total of four hundred (400) participants, split evenly between the psoriasis group and the healthy control group. Outpatient services at Index Medical College and Research Center in Indore were utilized in order to conduct examinations on each and every participant in both groups. **Results**: The present study observed a stable incline, positive correlation, and positive regression when compared between TC and FBS ($y = 0.2507x + 135.11$; TC and age ($y = 0.5559x + 140.55$) in psoriasis group. On the other hand, scatter diagram between serum TC and age in non-psoriasis control group showed a positive correlation with a regression equation of ($y = 0.3723x + 127.97$). **Conclusion**: If this line of research is given funding, investigations using both in vitro and in vivo models will help figure out how hyperglycemia works, which will allow medical professionals to have a better handle on the condition and prevent its problems from developing or worsening. These findings may potentially be of assistance to people in general.

Keywords: Lipid, Blood Sugar, Psoriasis

INTRODUCTION:

Extensive studies of all metabolic anomalies have failed to provide insight into all pathophysiologic changes in psoriasis. New areas of worry continue to arise as a result of the complications in inflammatory disorders. Worldwide million people approximately 2 to 3 percent of the total population have psoriasis, according to the World Psoriasis Day consortium [1]. The country most affected by psoriasis is Norway with a prevalence of 1.98% of the overall population [1]. The lowest prevalence is across East Asia at 0.12%. In general, prevalence rate of psoriasis varies from 0% to 11.8% among different populations, in India it varies from 0.44 to 2.8% [2]. Insulin resistance, hyperglycemia, and dyslipidemia exist in any inflammatory disease including psoriasis which may be the cause for mortality in these patients [3]. To name a few, genetic abnormalities [4], loss of insulin sensitivity [4], insulin resistance [4], high density lipoprotein insufficiency [5], oxidative stress [6], and glucose toxicity [7,8], are all potential causes of hyperglycemia and dyslipidemia. Multiple hypotheses, such as trace element deficiencies [9-13] and oxidative stress [12,13], may interact as insulin resistance and dyslipidemia pathogenetic pathways. The accurate prediction of risk factors for psoriasis will be helpful in reducing the severity of the disease and facilitating earlier diagnosis. Because of this, we based the design of the current study on the evaluation of study parameters in people whose glycemic levels are altered in some way, including hyperglycemia. The authors have considered inflammation as a factor in psoriasis by making the assumption that a physiological concentration level of lipids and fasting blood sugar (FBS) will alter the level of inflammatory markers that are responsible for the progression of psoriasis disease. The aim of the present study is to compare and correlate

the association of lipids and FBS in the individuals affected with psoriasis and the non-psoriasis controls.

MATERIAL AND METHODS:

The current study included a total of four hundred (400) participants, split evenly between the psoriasis group and the healthy control group. Outpatient services at Index Medical College and Research Center in Indore were utilized in order to conduct examinations on each and every participant in both groups. The authors of the study went on and started the work after first obtaining approval to do so from the institutional ethics committee. Before beginning this study, informed consent was obtained from all of the participants. This consent was received before the study ever began.

Collection of samples:

All of the patients in both groups were given a complete physical examination by a licensed medical professional working in the medicine department of the hospital where the research was carried out. This was done in accordance with established protocols and with an eye toward the inclusion and exclusion criteria established for this particular study. The criteria established by the World Health Organization were utilized in order to arrive at the conclusion that the individual suffered from psoriasis. The rules established by the American Diabetes Association served as the basis for the development of the criteria for insulin resistance and hyperglycemia. Individuals of the same age and gender who were considered to have a normal glycemic state were chosen for the control group. A certified physician conducted a physical examination on each of the subjects in accordance with the approved protocols and procedures. Exclusion criteria were Type 1 and type 2 diabetes individuals, psoriasis patients and with pathological conditions for control subjects. Inclusion criteria for healthy controls were non-psoriasis patients, not taking multivitamin supplementation, and having no other secondary pathologies.

Sampling procedure:

In a completely sterile environment, five milliliters of fasting venous blood was extracted from each and every participant in both groups using a single-use syringe and needle, which was then placed in glass vials. After separating the blood using centrifugation of the blood at 3000 rpm for 20 minutes, serum samples were aliquoted and stored at 20 ° C until the assay could be performed on them.

Parameters analyzed:

Serum TC was estimated by using the method of Cholesterol Oxidase and Peroxidase (CHOD/POD). Serum TAGs was estimated by using the method Glycerol Phosphate Oxidase and Peroxidase (Liquid stable). Serum HDL was estimated by using the method polyethylene glycol (PEG) and phenol and 4-aminoantipyrine (PAP). Plasma glucose was estimated by Glucose Oxidase and Peroxidase (DPEC – GOD/POD) method. purchased from Avantor Performance Materials India Limited, Dehradun, Uttarakhand, India. Steps were followed as per the instructions given by the supplier.

Statistical analysis:

Newest version of IBM SPSS was used for all statistical analysis. The Unpaired t-test is the appropriate tool to employ when contrasting the averages of variables from two independent samples. In order to learn more about the link between the two variables, we used the Pearson correlation. This finding is statistically significant because the significance level is smaller than.05.

RESULTS:

Table 1 displays, for each group, their levels of FBS, PPBS, insulin, and the homeostasis model assessment of insulin resistance (HOMA-IR). When comparing the two groups' mean levels of insulin ($t=14.29$; $df=398$; $P < 0.05$), FBS ($t=18.17$; $df=398$; $P < 0.001$), and HOMA-IR ($t=0.926$; $df=398$; $P < 0.05$), we find that there is a statistically significant difference between the two groups. This is shown in Table 2. In the psoriasis group, the average blood glucose level is found to be 195 mg/dL after eating, while in the control group, it is found to be 128.9 mg/dL. When compared to controls, we discovered that psoriasis participants had a HOMA-IR that was about half a percentage point higher. By combining people of the same age and gender from both groups, we were able to perform the calculations necessary to determine increases in percentages. In addition to this, we calculated the HOMA-IR to gain a deeper comprehension of the IR intensity across both groups.

Table 1: Glycemic profile of psoriasis and control subjects of the study

Variable	Psoriasis group (n=200)	Non-psoriasis group (n=200)	P Value
FBS (mg/dL)	127.5±29	88.8±14	**<0.0001**
PPBS (mg/dL)	195±78.2	128.9±28.1	>0.05
Insulin (µU/mL)	32.4±5.8	24.4±11.2	**<0.05**
HOMA-IR	29.3±2.8	23.4±8.8	**<0.05**

The present study observed a stable incline, positive correlation, and positive regression when compared between TC and FBS (y = 0.2507x + 135.11; TC and age (y = 0.5559x + 140.55) in psoriasis group. On the other hand, in figure 3, scatter diagram between serum Tc and age in non-psoriasis control group showed a positive correlation with a regression equation of (y = 0.3723x + 127.97).

Figure 1: Scatter diagram showing relationship between TC and FBS in psoriasis group individuals

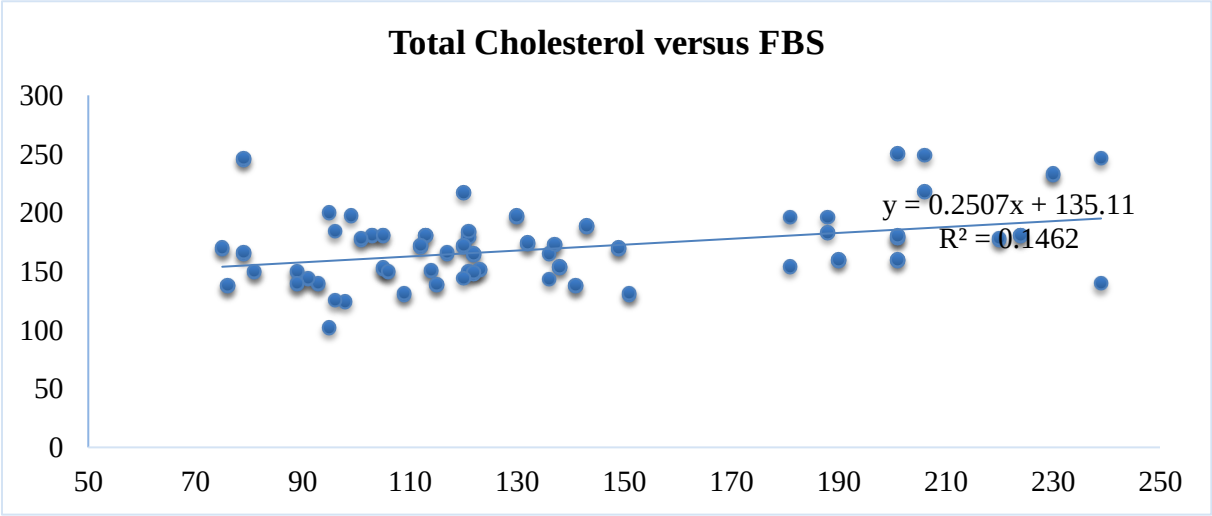


Figure 2: Scatter diagram showing relationship between TC and Age in psoriasis group individuals

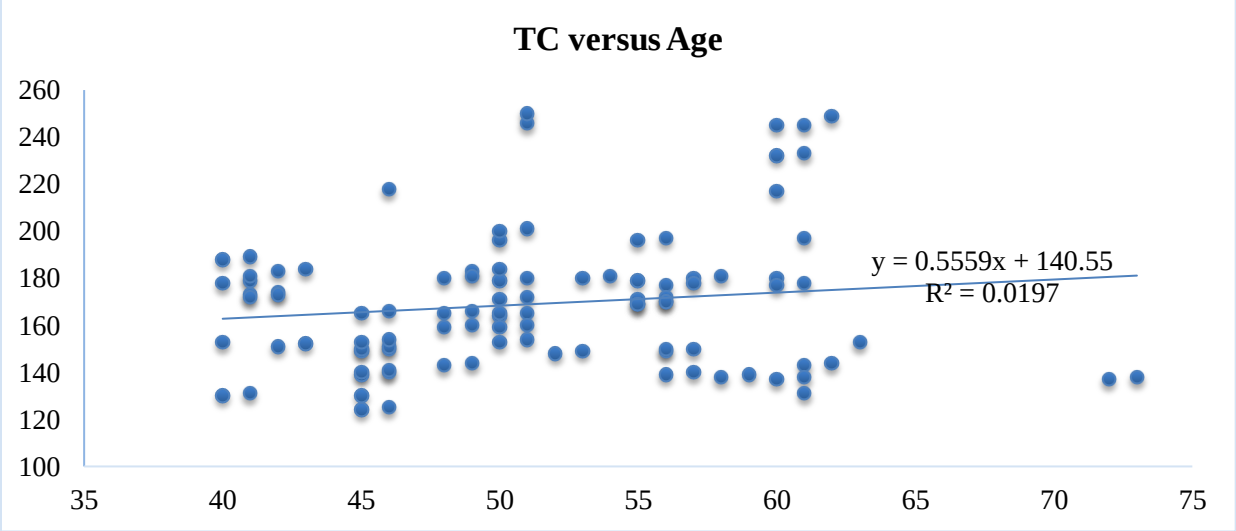
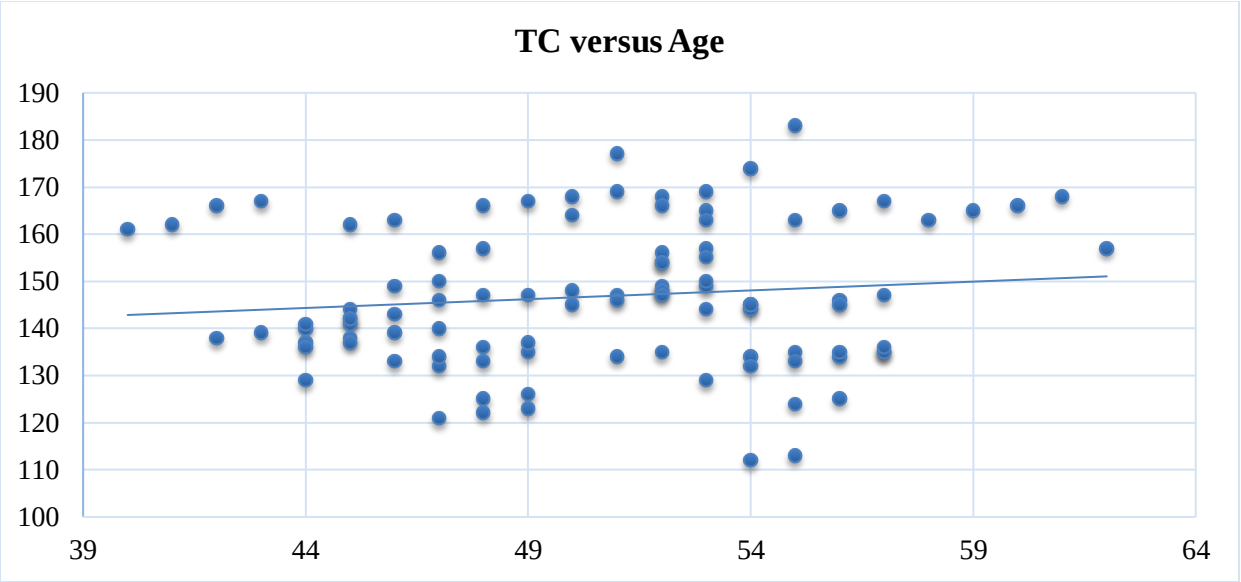


Figure 3: Scatter diagram showing relationship between TC and Age in non-psoriasis control individuals



DISCUSSION:

Insulin resistance can influence lipid levels in a number of ways, one of which is through the increased production of essential enzymes involved in lipid metabolism [14-17]. Insulin is known to stimulate apolipoprotein A and HDL production in the liver in order to facilitate the transfer of triglyceride-to-acylglycerol (TAG) from one lipoprotein to another [18-20]. HDL is a lipoprotein that is recognized for transporting cholesterol to the liver and transferring triglyceride-to-acylglycerol (TAG) from one lipoprotein to another [19]. HDL is a type of lipoprotein that plays an important role in the transport of cholesterol throughout the body [14,15]. This pathway becomes less effective as insulin resistance increases, which in turn causes HDL secretion to become impaired [20]. According to these findings, elevated glucose levels and the accumulation of triglycerides were both related with insulin resistance as well as insulin resistance in and of itself. Studies such as those conducted by [21-24] have established that psoriasis is an inflammatory disease, and that this disease is associated to significant changes in the lipid and lipoprotein profiles of patients with the condition [25,26]. Psoriasis is characterized by an improper balance between cholesterol synthesis and consumption, which suggests that this imbalance may contribute to a decline in HDL levels. HDL is a kind of cholesterol that helps protect against cardiovascular disease [27]. People who suffer from autoimmune illnesses, such as diabetes mellitus, psoriasis, and human immunodeficiency virus, are more likely to have elevated levels of cholesterol in their blood [25]. In a study that was conducted [24] revealed that patients with psoriasis had higher levels of cholesterol compared to the controls and discovered that the total lipid levels in the serum of psoriatic patients were significantly elevated compared to normal levels. In a second study [23] patients with psoriasis were shown to have dyslipidemia. The disparities between the psoriasis patients and the controls were most prominent in the HDL values. According to the findings of the research that was conducted [26], the serum cholesterol levels of the control subjects were found to be significantly lower than those of the psoriasis patients. Patients suffering with psoriasis were shown to have significantly lower HDL values and significantly higher total cholesterol levels compared to healthy control volunteers. According to the findings of a number of studies [26,27], it is possible that psoriatic patients and normal individuals do not have a distinguishable difference in their serum cholesterol levels. According to the findings of a different experiment [28], psoriasis is not associated with a metabolic issue that involves HDL lipid. Psoriasis has been connected to a variety of different possible reasons, one of which being elevated cholesterol levels. According to the findings of [29], alterations in paraoxanase and arylesterase levels were related with higher cholesterol levels in psoriasis patients. Patients who suffer from psoriasis have been observed to have higher lipase levels, which Pietrzak et al [30] attribute to the defining characteristic of their illness, which is excessive cholesterol. According to study [30] that was completed in 2010 and published that same year, elevated cholesterol levels in psoriasis patients can be linked to an over-expression of interleukin-17 and interleukin-22 in the skin that is affected by the disease. Chronic inflammation, which is thought to be the cause of high cholesterol levels, has been related to cytokines

released by the human immune system during disease [31-33]. However, based on the findings of the current investigation, we may infer that the significant rise in levels that was observed in patients with psoriasis was the result of a breakdown in the transport of cholesterol from extra-hepatic tissues to the liver. Recent studies [34-36] have demonstrated that HDL lipoprotein works improperly in chronic inflammatory disorders such as psoriasis and atherosclerosis. When compared to the control group of adults who did not have psoriasis, the participants in this study who had psoriasis were more likely to have hyperglycemia. In a study, researchers discovered a correlation between psoriasis and hyperglycemia and insulin resistance may be to blame for the decreased HDL levels that were seen in persons with psoriasis in the current investigation [36]. As a result, we have reached the conclusion that insulin resistance was the root cause of hyperglycemia in the psoriasis patients who participated in the study. Research has shown that one of cholesterol's physiological functions is to serve as a precursor to steroid hormones and bile acids, in addition to providing structure to cell membranes [36]. Certain hormones regulate the intake, synthesis, absorption, and excretion phases of the cholesterol metabolic cycle [36]. This allows the hormones to keep the body's overall cholesterol metabolism in balance. If this dynamic cycle were to be disrupted by causes such as aging [37,38], disease [39], hormonal disorders [40], or oxidative stress [41], cholesterol levels would become imbalanced. Research has shown that one of cholesterol's physiological functions is to serve as a precursor to steroid hormones and bile acids, in addition to providing structure to cell membranes [36]. Certain hormones regulate the intake, synthesis, absorption, and excretion phases of the cholesterol metabolic cycle [36]. This allows the hormones to keep the body's overall cholesterol metabolism in balance. If this dynamic cycle were to be disrupted by causes such as aging [37,38], disease [39], hormonal disorders [40], or oxidative stress [41], cholesterol levels would become imbalanced. In the group that we used as a control, we discovered that there was a correlation between age and cholesterol levels. A similar significant link was found between age and cholesterol levels in the group of people who suffered from psoriasis. At first glance, this appears to be a contradiction; however, one plausible explanation is that the increase in cholesterol levels serves as a protective mechanism against the detrimental effects of aging [33-41]. In addition, the body of academic research indicates that aging is a degenerative process that occurs in all organisms, and that oxidative stress increases with increasing age. As a consequence of this, the factors that have been offered can be utilized to provide an explanation for the link that was discovered between the psoriasis groups and the non-psoriasis groups.

CONCLUSION:

According to the findings of this study, the development of secondary problems in patients with psoriasis is closely linked to changes in the levels of lipids in their plasma. The findings of this research indicate that the variations that were observed in the parameters of the study can be traced back to an imbalance in the manner in which psoriasis patients absorb cholesterol and its transportation in the body. If this line of research is given funding, investigations using both in vitro and in vivo models will help figure out how hyperglycemia works, which will allow medical professionals to have a better handle on the condition and prevent its problems from developing or worsening. These findings may potentially be of assistance to people in general.

Conflict of interest:

No existence of conflict of interest among the authors of the study.

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