



**ORIGINAL ARTICLE**

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## **Are Hypercholesterolemia and Hypertriglyceridemia the potential risks for Superficial fungal Infections caused by *Malassezia spp.*?**

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### **ABSTRACT**

*Malassezia furfur*, an opportunistic and lipophilic yeast, is etiologic agent of pityriasis versicolor and characterized by hypo or hyperpigmented scaly patches which appear principally in the trunk. Regarding the lipophilic characteristic of the yeast, this study was done to evaluate that dose hypercholesterolemia and hypertriglyceridemia affect on incidence of pityriasis versicolor (P.V) or not? 1700 subjects ranging from 10 to 56 years old were evaluated in this cross-sectional study in Golpayegan, Kashan and Meimeh cities in Isfahan province. Of total subjects, 102 individuals showed pityriasis versicolor which disease confirmation was based on clinical signs, sampling, inoculation and culture on Dixon media and sabouraud dextrose agar (SDA). Total cholesterol and triglyceride in patients and control group in fasting manner were measured by automated chemistry analyzer (RA 1000). Subject's data such as job, age and hygienic level as well as personal habits were gathered by questionnaire. All data analyzed by t-student, Pearson correlation and Chi square tests and ( $P < 0.05$ ) was considered significant. Prevalence of P.V was 6% in all age groups. The maximum and minimum prevalence rates of P.V were 2.8% and 0.7% at the age groups 21- 32 and 45-56, respectively. The maximum and minimum rates of total triglyceride were seen at the age groups 45- 56 and 9- 20 with  $175 \pm 14$  mg/dl and  $117 \pm 9$  mg/dl, respectively. The maximum and minimum rates of total cholesterol were seen at the age groups 45- 56 and 9- 20 with  $240 \pm 21$  mg/dl and  $190 \pm 15$  mg/dl, respectively. This study showed that hypercholesterolemia and hypertriglyceridemia didn't affect on incidence of P.V and positive correlation was not seen between P.V and hypercholesterolemia and hypertriglyceridemia ( $P < 0.05$ ),  $r = -0.095$ ,  $r = -0.091$ .

**Key words:** Pityriasis versicolor, hypercholesterolemia, hypertriglyceridemia

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### **INTRODUCTION**

Pityriasis versicolor (P.V) is a chronic superficial fungal infection which characterized by pigmented scaly maculopatches in different size, which appear mainly in neck, arms and trunk [1, 2]. Causative agent of P.V is *Malassezia* genus which today 13 species of the genus are known such as *Malassezia furfur*, *M. sympodialis*, *M. globosa* and *M. restricta*. *Malassezia* genus is lipophilic yeast other than *M. pachydermaties*. *Malassezia* genus is part of normal flora of the human and other mammal's skin [3]. Prevalence of P.V increases in high humidity and temperature regions and affect mainly adults (both gender). P.V is a recurrent disease and its diagnosis is based on clinical observations and laboratory experiments. Different species of *Malassezia spp.* can be identified by molecular analysis and culture, although P.V is not life-threatening but imposes great social stigma to patients and their families [4].

The studies has been shown that hyperlipoproteinemia has predisposing effect on incidence of *Candida albicans* infection, although both defect or increase in lipoproteins affect on incidence of superficial fungal infection [5].

Apolipoprotein E (Apo E) is a protein component of LDL, VLDL and HDL (lipoproteins) and apo E localization has demonstrated in normal skin by immunohistochemistry method [6,7].

In human, total plasma cholesterol is about 150-200 mg/dl, which the greater part found as esterified form. Triglyceride are mainly found in chylomicron. Cholesterol is transported in lipoprotein in plasma and highest proportion is found in LDL. So, regarding the increase in cholesterol and consequently increase in its transport by LDL to tissues such as skin in a side and lipophilic nature of *Malassezia* in other side, we decided to evaluate that does hypercholesterolemia and hypertriglyceridemia affect on incidence of P.V?

## MATERIALS AND METHODS

### Subjects:

This cross-sectional study was done on 1700 subjects (males) ranging from 10 to 56 years old in Golpayegan, Kashan and Meimeh cities in Isfahan province in 2014. All individuals were filled the consent forms. None of them have diabetes and consumed broad spectrum antibiotics and corticosteroids. Subject's data such as job, education level, age, hygienic level as well as their personal habits like excessive sweating and family history are gathered.

### Clinical finding and laboratory experiments:

All subjects were clinically examined and direct mycological sampling was done from lesions and microscopically seen by KOH 20% and blue methylene (Nikon, Japan). Types of lesions from aspects of color (such as hypochromic, hyperchromic, erythematous), form (popular, follicular) were evaluated.

Disease confirmation was based on culture and inoculation onto the sabouraud dextrose agar (SDA) supplemented with 0.05% chloramphenicol and olive's oil as well as Dixon media then plates were incubated at 32 °C for 2 wks.

Glabrous colonies with creamy yellow color were considered as positive. 102 individuals were diagnosed to be patient and in parallel, 102 healthy subjects were randomly selected at the same year ranges as control group.

Blood sample were collected in tubes without coagulant and used to separate serum samples from patients and control group in lasting manner. Total cholesterol and triglyceride were measured by automated chemistry analyzer (RA 1000, Germany).

### Statistical analysis:

Results were analyzed by SPSS statistical package version 15 and *t- student*, *Chi Square* and *Pearson* correlation tests and ( $P < 0.05$ ) was considered significant.

## RESULTS

Prevalence of P.V was 6% (102 individuals) which maximum and minimum rates were seen at the age groups 21- 32 and 45- 56 years old with 2.8% and 0.07%, respectively. The maximum and minimum rates of total cholesterol were seen at the age groups 45- 56 and 9-20 years old, respectively. The maximum and minimum rates of total triglyceride from aspect of age group were like total cholesterol (Table 1).

47% ( $48/102$ ) has past history of P.V. while 53% ( $54/102$ ) were reported the first episodes of P.V. 40.2% were reported family history and 60.8% have excessive sweating. From aspect of occupation, the maximum rate participated was government worker with (41.17 %) 700 individuals (Table 2).

The maximum rate of patients was student and the minimum rates were others. Regarding the analysis of results, significant correlation was not seen between hypercholesterolemia and hypertriglyceridemia and incidence of P.V ( $P < 0.05$ ),  $r = (-0.095)$  and  $(-0.091)$ , respectively.

The maximum rates of total cholesterol and triglyceride were seen at the age group 44-56 years old but the minimum rate of P.V was seen in this age group.

Table 1- The mean total cholesterol and triglyceride in patients and control group

Age groups (n)	Patients (%)	The mean total cholesterol (Mean±SD) <sup>mg/dl</sup>	Control group	The mean total triglyceride (Mean±SD) <sup>mg/dl</sup>	Control group
9-20 (440)	25 (1.47)	190±15	187±14	117±9	110±8
21-32 (580)	49 (2.8)	195±18	197±14	128±11	125±14
33-44 (350)	15 (0.8)	210±12	202±14	150±8	146±17
45-56 (330)	13 (0.7)	240±21	240±10	175±14	168±13
Total	102(6)	-	-	-	-

Table 2- The relationship between P.V and occupation in patients

Occupation	Frequency	%	Patients	%
Student	440	25.89	74	72.5
Unemployed	180	10.6	-	-
Government worker	700	41.17	10	9.8
Liberal professional	300	17.65	8	7.9
Retired	60	3.52	6	5.9
Others	20	1.17	4	3.9
Total	1700	100	102	100

## DISCUSSION

Pityriasis versicolor with ethologic agent of *Malassezia spp.* genus is a chronic superficial fungal infection which frequent in tropical regions [3]. Prevalence of P.V at young ages has been reported to be more common in tropical regions with high humidity and temperature [4]. Lesions have various shapes and color from papules, macules to hypo or hyperchromic lesions, respectively. In this study the prevalence rate of P.V was 6% which in accordance with tarazooie et al. [8]. The maximum rate of P.V was seen at the age group 21- 30 which in accordance with De Morais et al, Petry et al and Crespo- Erchiga et al.[ 9,10,11]. The mean total cholesterol at the age group of 21- 32 and 45-56 years old was  $195 \pm 18$  mg/dl and  $240 \pm 21$  mg/dl respectively. The negative correlation was seen between mean total cholesterol with incidence of P.V as well as mean total triglyceride with incidence of P.V but Nikkhah et al. was reported the direct correlation between total cholesterol with incidence of P. V which was in contrast with our study[12]. Tursten has reported VLDL, LDL and triglyceride have no significant correlation with incidence of P.V which in accordance with our study [7], also Vanden Bossche et al has mentioned no significant correlation between cholesterol levels with incidence of P.V [13]. The most frequent of patients was government worker which in accordance with other studies [14, 15]. Like other studies, the most prevalence of P.V was seen in young ages (21-32 years old) [2, 3, and 5]. Although, significant correlation was not seen between mean total cholesterol and total triglyceride with incidence of P.V but proper dietary regime along with regular exercises are recommended.

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