Relationship between Big Five Personality Traits and Total Peripheral Lymphocyte Count (TPLC)

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Abstract

It is often argued that a blend of personality characteristics is known to affect the immune system. It has been identified that The Limbic Hypothalamic Pituitary Adrenal (LHPA) axis acts as the principal path of the communication between the immune system and the central nervous system. so this study was done to find out the relationship between Big Five personality traits and Total Peripheral Lymphocyte Count (TPLC) as a parameter of immunity in an undergraduate medical students (n=150). We calculated the correlation between personality variables and Total Peripheral Lymphocyte Count (TPLC). Further regression analyses were performed using personality variables as predictors and Total Peripheral Lymphocyte Count (TPLC) as criteria by using various statistical measures.

The results demonstrated that the Agreeableness and the Conscientiousness are the strongest predictors of lymphocyte count of all the personality traits. The results offer support for the hypothesis that stressed the essential links between personality and immune regulation.

Keywords: Big five; Personality Traits; Total Peripheral Lymphocyte Count (TPLC); Medical Students.

Introduction

Today it is well known that psychological stress has effects on the immune system, which can result in increased susceptibility to various infections, latent virus reactivation, and also influence immune-regulatory circuits [1]. A group of seven researchers, each of whom has uncovered a particular personality trait associated with psychological and physical well-being, since each trait has been directly or indirectly linked to a vigorous immune system, called as Immune Power traits [2]. The principal path of the communication between the immune system and the central nervous system has been linked to the HPA axis, which can also be influenced by psychological factors [3].

Our own psychological resources can be activated to prevent and to heal diseases affecting every organ and system of the body. Studies associated personality characteristics such as aggression and hostility as some of the variables that can affect the activity and number of lymphocyte populations [4, 5].

Now mind-body scientists are demonstrating the role of healthy traits in maintaining a healthy state of body. However, up until now less research has been conducted in regard to the possible connections of personality dimensions and the parameters of the immune system. The purpose of this study is, therefore, to examine the impact of personality type on the immune system with the help of Total Peripheral Lymphocyte Count (TPLC) of the students in the medical college using five-factor model of personality.

Aims and Objectives

- To investigate the relationship between Five Factor Model of Personality (FFM) and immunity with the help of Total Peripheral Lymphocyte Count (TPLC) in medical college Students.

- To find out which personality traits predict immune power personality in medical students.

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Segerstrom, Castaneda & Spencer (2003) [6] used the five factor model of personality to evaluate effects of optimism on immunity. The five factor model (FFM) is widely accepted as the most salient taxonomy of the basic personality structure [7]. The Big-5 are commonly used because they combine the best of Cattell's (1970) [8]. Authors' comprehensive list of personality traits with the best of Eysenck's (1991) [9] concise lists. They are:

Extroversion	—	Introversion
Neuroticism	—	Stability
Agreeableness	—	Antagonism
Conscientiousness	—	Un-directedness
Openness	—	Non-openness

Extroversion

Extraverts are usually sociable, talkative and communicative, and friendly. They are described as active, bold, assertive, exciting, and stimulating. Introverts on the other hand tend to be reserved, even-paced and independent.

Conscientiousness

They are predisposed to be organized, exacting, disciplined, diligent, dependable, methodical, and purposeful. They have an intrinsic motivation and a positive attitude. Students low in conscientiousness tends to be less careful, less focused and more likely to be distracted from tasks.

Agreeableness

Agreeableness or likeability refers to such traits as selflessness, good-natured, gentle, co-operative, flexible, tolerance, generous, sympathetic, courteous, striving for common understanding, and maintaining social affiliations.

Students low in agreeableness tends to be more aggressive and less cooperative.

Neuroticism

The individuals who score high on neuroticism tend to experience effects such as fear, sadness, embarrassment, disgust and anger. Those who score low in this area are usually calm, even-tempered and relaxed at work and in their personal lives.

Openness to experience

These individuals feel both the good and the bad deeply, rendering its directional influence on affective reactions like subjective well-being or performance satisfaction unclear.

The past ten years have seen a growing number of studies on the personality correlate of immune system. Segerstrom, Castaneda & Spencer (2003) [6] found that only Conscientiousness had an effect on the parameters of the immune system, measured by the DTH (delayed-type hypersensitivity) response. Although the associations between WBCs and broad personality traits tend to be mixed [10], narrower traits, such as impulsivity, may share stronger relations with health related variables than the broad domains [11].

A study by Miller, Cohen, Rabin, Skoner & Doyle (1999) [10] examined three dimensions of the five factor model (Extraversion, Agreeableness and Neuroticism) and found no differences in leukocyte subsets for any of the dimensions. The current study focuses on the relationship between the Big Five and Total Peripheral Lymphocyte Count (TPLC) as the measures of the immune system function.

Neutrophils and lymphocytes account for most WBCs. Neutrophils, as part of the innate immune system, respond to acute injuries, whereas lymphocytes, as part of the adaptive immune system, determine the specificity of immune response. Neutrophils have a short lifespan, ranging from hours up to a few days, whereas lymphocytes may remain in the blood stream for years. at least some of the Big Five could be connected with the Total Peripheral lymphocyte Count (TPLC) as the measures of the immune system, we could predict substantial correlations with immune system measures for Conscientiousness on the basis of the Segerstrom et al. (2003) [6] study, and for Neuroticism because of its known relatedness to distress and coping [12]. It can also be expected that there is the connections between Agreeableness and lymphocyte measures, due to the role of this personality factor in risk, stress, and burnout management [13] and in the activation of the autonomous nervous system. Consequently we can also assume that the Big Five could have an essential predictive function in relation to immune system parameters.

Materials and Methods

This study was conducted in the people's medical college and research centre, Bhopal (MP). We collected data from 150 students of first MBBS 2011-2012 batch. Of these individuals, 85% were males and 65% were females. Demographic information

such as age, gender was collected, Inclusion criteria was 150 healthy medical students of first MBBS batch 2011-2012, Exclusion criteria- Students who are having any major illness were excluded from the study.

Ethical clearance was taken from institutional ethical committee and written consent was taken from the students of first MBBS those who are involved in the study.

At the start of the semester during classes a personality inventory was administered to the students. We used personality inventory questionnaire of Buchanan (2001) based on Five-Factor Modality (FFM). The students rated each item on a 5-point Likert-type scale (1= strongly disagree, 5 = strongly agree). The FFM is based in a belief that people are rational beings and count for their own personality and behaving, can analyze their own actions and reactions (McCrae & Costa, 1996).

Immunological Assessment

Peripheral human blood leucocytes were collected by the finger prick method by taking all aseptic precautions in the haematology lab of department of physiology. Then Total Leukocyte Count (TLC) using Turk's fluid was performed on the improved Neubauer's chamber. While the differential count from peripheral blood smear was done by using Leishmans stain and from total 100 different white blood cells percentage distribution of lymphocytes were counted. Both Total and Differential white cell count was done by using Electron microscope and by following all the standard criterias.

By using above readings Total Peripheral Lymphocyte Count (TPLC) was calculated by the formula: TPLC = TLC X percentage of lymphocytes in differential count. Then correlation between big five personality traits and Total Peripheral Lymphocyte Count (TPLC) was calculated by using various statistical methods.

Table 1: Statistic of personality scale and Total Peripheral Lymphocyte Count (TPLC)

Personality traits	Mean	SD	Total Peripheral Lymphocyte Count(TPLC)
Agree	3.43	0.50	.840
Cons	22.78	4.36	.737
Open	30.53	6.62	.252
Extra	24.34	6.5	.095
Neuro	30.60	5.37	.080

Table 2: Regression analysis of personality traits and Total Peripheral Lymphocyte Count (TPLC)

Personality traits	Total Peripheral Lymphocyte Count(TPLC)	Significance level
Agree	0.840	0.003[*]
Cons	0.737	0.004[*]
Open	- 0.252	0.179
Extra	0.095	0.633
Neuro	0.080	0.530

Result

Table 1 presents the results of statistics of personality scales and lymphocyte count. The table shows the mean of lymphocyte count and the means of their personality traits (agreeableness, conscientiousness, openness, extroversion, and neuroticism) According to the findings there is higher lymphocyte count with Agreeableness as well as Conscientiousness personality traits than other personality traits.

Table 2 shows Relationships between Personality Traits and lymphocyte count. Regression analysis was done to find out the influence of the students personality traits as predictor and Lymphocyte count as criteria. All five personality factors show substantial percentages of variance of Lymphocyte count.

The Agreeableness and Conscientiousness factor was the only significant predictors of Lymphocyte count.

Agreeableness (0.840) and Conscientiousness (0.737) are the strongest predictors among

personality variables. The Openness, (- 0.252), Extraversion (o.095), and Neuroticism (0.080) these personality traits are not significant statically.

It is thus conclude that the students high on Agreeableness and Conscientiousness traits had higher Total Peripheral Lymphocyte Count (TPLC) in our study.

Discussion

In this study we focused on the connection between personality factors and lymphocyte count. The results of the study suggest that the Big five factors can predict immune status of the body with the help of Total Peripheral Lymphocyte Count (TPLC).

results of this study shows that Agreeableness and Conscientiousness are the most important predictive factors of immunity, This is consistence with the study by Ana Ožura, et al, 2012 and Cohen et al,1997 [14, 15]. The possible link between Agreeableness and immune function may be elucidated by the fact that both are associated with the quality of social relationships. More agreeable persons enjoy more social support which in turn increases their immunological effectiveness. Individuals high on Agreeableness are altruistic, emphatic, cooperative, and moral and trusting [16], those who are low on this trait might experience more stress and less support from colleagues and superiors. In stress research, Agreeableness was found to be the main protective factor (when highly expressed) and main risk factor (when it is low) for burnout [17]. Furthermore it is possible that Agreeableness is connected with sympathetic nervous system activity. Miller (1999) [1] found that individuals with low Agreeableness tended to have higher blood pressure and epinephrine due to increased catecholamine production and which in turn suppresses the immune functions, since it is hypothesized that chronic secretion of catecholamine's down regulates glucocorticoid receptor expression [1].

While individuals with high level of Conscientiousness demonstrate greater self discipline, greater adherence to ethical and moral standards and strong sense of order. Further they strive for achievement and are cautious in their action. Conscientiousness is most likely to influence immunity through its relationship with better health practice and adherence to medication regimen. The association between Conscientiousness and immunity has been addressed in four studies [15]. Study addressing the connection of the conscientiousness trait with immune parameters found that conscientiousness has an effect on DTH (delayed-type hypersensitivity) response due to the association of this trait to optimism [6]. A number of other studies suggested that optimism is related to immune parameters [6, 15] depending on the type of the stressors involved.

In this study there are no correlations between Neuroticism and Lymphocyte counts. Although Miller [1] (1999) did find higher cortisol levels he did not obtain any differences in white blood counts in individuals with high Neuroticism. He concluded that individuals with high Neuroticism often report somatic complaints but have no physiological, objective basis for them. One could speculate that, although Neuroticism is connected with higher distress [12]. It is more an indicator of heightened sensibility than a predictor of objective differences in health status. Also there is no positive correlation between openness and Extraversion type of personality with the immunity in this study.

The results of regression analyses revealed a possible role of the Big five factors in predicting Total Peripheral Lymphocyte Count (TPLC).

Reports show that reduction of T lymphocyte is connected with an increased risk of inflammation [18] while the reduction in B lymphocyte counts affects humoral immunity and reduces the protective function of antibodies [19].

It is therefore interesting to note that certain personality factors can be associated with increased Lymphocyte count. The association between these traits and higher lymphocyte counts may reflect the tendency of these individuals to get in to situations that expose their immune systems to more pathogens. The relation between lymphocytes and immune function is complex; some types of lymphocytes promote good immune function, whereas others contribute to chronic inflammation [20]. In the present research, although we did not distinguish between different types of lymphocytes, these associations suggest that the total lymphocyte count may predominantly reflect the types of cells that contribute to pathological states.

There are several possible interpretations of how personality factors and Lymphocyte counts could be related. As already mentioned, the personality dimensions have influence on stress behaviour, and may consequently affect the functioning of the immune system (and vice versa) in its entire neuro-endocrine context. Solomon and Moos (1964) [21] wrote about the influence of stress and emotions on adrenal cortical steroid hormones 40 years ago.

However, it is questionable whether the general explanatory model linking psychological factors to neuroendocrine responses to stress by HPA (Hypothalamo-pitutory axis) axis activation could explain all the variance in blood cell count associated with personality factors [14].

In addition the possibility of the vice versa effect (the immune system factors influencing personality) should be considered similarly to the process seen in long-term sickness behaviour [22]. Both personality and immune system factors are genetically determined [23, 24, 7] a possible genetic relation between them seems possible [23].

Both personality dimensions and immune function are related to the activity of the most investigated neurotransmitter systems in the brain, especially noradrenergic, cholinergic, serotonergic, and dopaminergic systems [25].

Differences in affect and optimism are related both with personality dimensions and immunological regulation and can therefore contribute to the general relationship between personality and the immune system, Personal relationships, especially social support, are also linked with immune function [26].

On the whole, the results of our study offer some support for the hypothesis that stressed the role of personality factors in the activity of the immune system but further research is needed [27, 6, 14]. This research has implications for how we understand the connection between psychological processes and physical health. Our findings suggest that characteristic ways of thinking, feeling, and behaving share relations with immune response.

Our study has several limitations the most important of them is the small number of participants and also we have not considered the different types of lymphocytes.

And quantitative measures of the immune system parameters (such as Lymphocyte counts) might not be the best way of assessing the immune status. Qualitative measures (such as DTH response) are clinically more relevant [6].

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