Original Research Article

Stress, Anxiety and BMI: A Comparison of Healthy Individuals with Those Reporting Physiological Problems

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ABSTRACT

The rising prevalence of non communicable diseases is the cause of concern among the health professionals, academicians, etc. The focus has turned towards the efforts required for firstly, unraveling the possible associated factors working as the ground-stone for such a rise and secondly, to meet the challenges related to provision of the adequate treatment facilities in all the regions of India. Thus, the present exploratory study is an attempt to firstly, identify the physiological problems among the subjects. Secondly, exploration and comparison of stress, anxiety and BMI between healthy and diseased subjects were made. Stress and anxiety levels were found to be significantly higher in diseased individuals as compared to healthy. Further, studies are required with a large sample size.
Key words: Stress, anxiety, BMI, healthy and disease.

INTRODUCTION

Prevalence of health related problems like hypertension, diabetes, anemia; etc is quite alarming in India. While attracting focus upon the health scenario in India, it was revealed that though there are some significant health status achievements but interstate, regional, socioeconomic class and gender disparities remain high, such as rural Indian populations are prime victims of unsafe and unhygienic birth practices, unclean water, poor nutrition, subhuman habitats, degraded and unsanitary environments, which in turn, lead to malnutrition, zoonotic diseases, skin and respiratory diseases, socio psychological problems of females, geriatric and adolescent, etc. [1] The current status and

expected trends of key non communicable diseases in India are: 5.1crores (2010) are suffering from diabetes and it is expected to rise to 8 crores by 2030, 2.9 crores (2010) suffering from cardiovascular diseases and it is expected to rise to 6.4crores by2015 and 6-7% population is suffering from mental disorders from which, 1-2% have severe mental disorders.[2] Prevalence of hypertension was estimated to be 40.8% in urban and 17.9% in rural Indian population. [3] The concerns regarding the rapid increase of hypertension in most low and middle income countries driven by diverse health transitions are being addressed and also, health professionals, civil society and academia are suggested to assume leadership for focused advocacy efforts to

raise priority of hypertension and control. [4] Marked increase in the prevalence of diabetes has also been seen among both rural and urban Indians, with a suggestion that southern India has seen the sharpest increase. [5] Anemia is also highly prevalent in all sections Indian population, with difference only in its severity. It was revealed that prevalence rate of severe anemia is high among adolescent girls. [6] Regional disparities in the prevalence of diseases like diabetes has also been revealed like diabetes is most prevalent in Ernakulam and Manipur is least affected. [7] Hence, it raises the necessity to understand the disease status in specific reference to Uttarakhand state.

Specifically, in reference to Uttarakhand it is unveiled that prevalence of anemia in Dehradun district is pregnant women is 65.5% and 66.0% in lactating mothers and it is also suggested that this problem may even be more serious in the inaccessible hilly and tribal regions of the state. [8] In a non-communicable disease risk factor survey of Uttarakhand by Indian Council of Medical Research, in which, 4022 households participated of rural and urban areas of Uttarakhand and it was revealed that 4% respondents revealed to be diagnosed hypertensive by health professionals (4% males and 5% females; 8% urban and 3% rural) and around 1% reported a history of raised blood sugar of which 31% were taking insulin and 79% were on oral drugs. Moreover, 89% population of Uttarakhand was found to be consuming less than five serving of fruits and vegetables per day and on average only 3 days a week people consumed fruits against vegetables 5 days a week. [9]

The present disease status in Uttarakhand encourages a probe into their etiological factors. Hence, the present study attempts to explore the following:

1. Identification of the physiological problem among the subjects
2. Exploration and comparison of stress, anxiety and BMI in the healthy and diseased subjects.

MATERIALS AND METHODS

In the present exploratory study, 100, that is, 65 healthy and 35 diseased samples having mean ages 29.77±8.13 and 36.6±9.03 respectively were randomly taken from five regions, namely, Pauri, Pithoragarh, Udham Singh Nagar, Haldwani and Dehradun of Uttarakhand state. Pregnant and lactating women, orthopaedically impaired and mentally unhealthy individuals were excluded from the study. Only those individuals who are of 22-50years of age and are residents of Uttarakhand or are working/living for ten or more years in the state were considered for the sampling. The subjects were informed about the study and their written consent was taken. Then, the subjects were asked to complete the questionnaires and on the basis of their self report the samples taken were further screened for their physiological state. Thus, the subjects were classified into two groups, namely diseased and healthy. Further comparisons were made between the groups for the levels of stress, anxiety and BMI for which the following tools were employed:

1) **Personal Stress Source Inventory (PSSI-sss):** It is developed by Singh et al. [10] It consists of 35 items and each item has three possible answer options, namely, seldom, sometimes and frequently. The scores describing stress levels are namely, mild (0-30), moderate(31-79) and high(80 and above). The test-retest reliability of the tool is 0.79 and 0.68 is the concurrent validity.
2) **Comprehensive Anxiety Test (C.A. Test):** It is developed by Bharadwaj et al. [11] It consists of 90 items with

two answer possibilities, yes and no. The raw scores are then converted into percentiles with the help of norms of the test. The percentile norms describing the anxiety levels are very high or saturated (80+), high (upto70), Average or normal(40-60), low(16-30) and very low (upto 15). The test-retest reliability of the test is 0.83 and the co-efficient of validity is found to be 0.82.

3) **Body Mass Index (BMI):** Anthropometric details, viz. height, weight were collected of the individuals under study and BMI was calculated as weight (kg)/height(m^2).

4) **Statistical analysis:** t-test was applied to see the significant differences in studied variables between healthy and diseased subjects.

RESULTS

Out of total 100 sample included, 35 % reported to suffer from some physiological ailments. The disease reported by the subjects were diabetes, hypertension, hormonal imbalance, stones, asthma, anemia, allergy and problems associated with gastrointestinal tract (GIT). The most common aliment reported was anemia by 51.4% subjects, followed by hypertension (17.14%), asthma (11.4%), stones (8.6%), allergy and gastrointestinal problem (5.7%),

diabetes and hormonal imbalance (5.7%). Rest 65 % subjects reported to be healthy and not suffering from any kind of physiological disorders.

The comparative data for age, stress, anxiety and BMI between diseased and healthy subjects is presented in Table 1. The mean age of diseased subjects was found to be 36.6±9.03 years whereas, the mean age of healthy subjects was lower (29.77±8.13 years). On comparing the age between diseased and non diseased subjects, a statistically significant difference in age was seen which indicated that the dominance of diseases were higher in aged people than their younger counterparts.

Both the diseased and non diseased groups were further studied for psychological wellbeing by assessing their levels of stress and anxiety. It was observed that the diseased individuals suffered from significantly higher stress (44.29±15.47) compared to healthy controls (35.2±11.44). The anxiety levels were also found to be significantly higher for diseased group than the non-diseased group. The individuals suffering from physiological problems had an anxiety score of 29.74±16.02 compared to 22.58±12.3 for their healthy counterparts. BMI, an indicator of nutritional status, was compared between healthy and diseased subjects. An almost equal BMI was computed for diseased (22.57±4.06 kg/m^2) and non diseased group (22.36±3.39 kg/m^2).

Table1. Comparison of study variables between healthy and diseased subjects

Parameters	N	Healthy subjects	N	Diseased Subjects	P value
Age(yrs)	65	29.77±8.13	35	36.6±9.03	0.0002*
Stress	65	35.2±11.44	35	44.29±15.47	0.0012*
Anxiety	65	22.58±12.3	35	29.74±16.02	0.0144*
BMI (kg/m^2)	65	22.36±3.39	35	22.57±4.06	0.787

*significant

DISCUSSION

Health status is an important factor that determines quality of life and influence

psychological wellbeing. In the present study 35 subjects reported to suffer from some or other kind of physiological ailment

with anemia as most common problem, followed by hypertension and other disorders. Age was found to be a formative factor in dominance of disease. The age of subject suffering from physiological problems had significantly higher than their healthy equivalents. Similar significant association of age with morbidity was found in an earlier study done in Northern India. [12]

Since morbidities are associated with psychological wellbeing, hence level of stress and anxiety in diseased and non diseased subjects were compared and it was elucidated that the stress and anxiety levels were significantly higher in subjects experiencing physiological problem. The results are in agreement with the earlier researches, wherein an increase in psychological distress with the disease was revealed. [13] In another review article, relationship between psychosocial stress and diseases such as cardiovascular disease (CVD), upper respiratory disease, HIV, autoimmune disease has been elucidated. [14] Psychological stress is associated with body's inability to regulate the inflammatory response, as stress results in resistance of glucocorticoid receptor. The dysregulation of inflammation encourage the development and progression of diseases such as CVD, autoimmune disorder, asthma etc. [15]

Correspondingly, anxiety has also been found to play a role in somatoform disorders such as pain, weakness, nausea, dizziness, heart disease, chronic respiratory disorder, GIT conditions. Multitude of researches has ascertained relationship between anxiety and morbidity. A significant association between anxiety disorder and diabetes, [16] cardiac disorder, hypertension, GIT problem, genitourinary disorder and migraine in individuals with anxiety than those without anxiety has been established. [17] Bidirectional relationship between anxiety and ulcerative colitis and

IBD has also been revealed. [18] In a former study, it was observed that Iranian students with anxiety scored lower on measures of health and vitality. [19] Anxiety leads to immune dysregulation and thereby increases susceptibility to diseases.

A non-significant difference in BMI of diseased and non diseased subjects was found in the current study. The result is in line with previous study where a total of 575 adults were studied for evaluating the relationship between BMI and morbidity in state of Meghalaya, in North east India and it was concluded that although the mean BMI in individuals not reporting illness was higher than those who reported illness, the relationship between BMI and reported illness was not significant. The researchers concluded BMI a better indicator of standard of living than a predictor of illness. [20] Another study exploring relationship between BMI and illness found mix results. They observed a significant effect of low BMI on proneness to morbidity in Pakistan and Kenya but none in the Philippines and Ghana. [21] A clear picture on association of BMI with disease could be obtain on further classification of diseases, as functional limitation is found to be prevalent at both extremes of BMI distribution. Association of overweight with hypertension and joint conditions whereas underweight with bronchial and lung conditions, including asthma, intestinal conditions has been observed. [22]

CONCLUSION

The above study concludes that psychological health and physiological health are intertwined. Stress and anxiety level play a major role in determining the psychological health, as the individuals experiencing higher level of stress and anxiety were more prone to morbidity. To establish the cogent role of BMI levels in diseased and healthy subjects, further

investigation with the precise classification of type of disease with a larger sample size is required. Moreover, health is a complex topic, which needs addressing interaction of social, behavioral and biological factors for better understanding.

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