INTRODUCTION

Modern life is very materialistic and competitive, that is why we human beings are suffering from numerous chronic problems and tensions. Health and illness are determined by psychosocial conditions. Psychosocial explanations of these social variations include perceived inequality; stress, anxiety and less social connections. [1, 2] There are number of studies supporting the possible link between life stress and illness behaviour and chronic disorders. Over the last few years concepts regarding stress and coronary heart disease have found a positive correlation in all over the world. [3, 4] According to Global Burden of Disease study, during 1994-1998, 30% (15.3 million) deaths were due to coronary heart disease (CHD). [5] Cardiovascular disease is reported to be leading cause of death in world. Several risk factors have been identified to be associated with CHD which includes causative risk factors (hypertension, hyperlipidemia, and diabetes), conditional risk factors (triglycerides and lipoproteins), and predisposing risk factors (obesity, physical activity, sex, family history, socioeconomic factors, insulin resistance and psychological factors. [6] Chronic anxiety and tension have been suggested as factors in the development of CHD. There is strong evidence supporting prognostic associations with social isolation and low perceived emotional support and unhealthy life style behaviours in the development of CHD. [7] In India, it has been observed that there is age related increase in CHD. The incidence of myocardial infarction (MI) was more common in urban India than rural areas of India. [8] Studies in India have shown that heart attacks in India occur 10 yrs earlier than in west. Hence it is needed to undertake a well designed prospective cohort studies for evaluation of CHD in relation to psychological factors. [9] CHD is emerging as a major cause of death in India. It has been projected that 15 years from now India would have highest CHD deaths compared to any other country. Data from Christian Medical College, Vellore and All India Institute of Medical Sciences, New Delhi, over a period of 30 years showed a decline in admission for rheumatic heart disease.
(RHD) and increase in admission for CHD. In India, in the past five decades, rates of coronary disease among urban populations have risen from 4 percent to 11 percent and four Indians die every minute due to heart ailments. Studies on type A behaviour in Indians have demonstrated a strong correlation of stress with angiographically proven coronary artery disease.

**Aims**

To compare CHD patients and matched Non-CHD individuals in relation to stress, anxiety and type-A behaviour pattern, particularly in Indian setting.

**MATERIALS AND METHODS**

This section describes the method employed to test the hypotheses framed to achieve the objectives of the study. This includes the description of the subjects included for the study, the tools included, the procedure that involved for data collection, and the statistical procedure used to analyze the data obtained.

**Sample**

The patients for the present study were selected from Cardiac Care Unit (CCU) of hospitals from Pune city, India. Men are at a higher risk for developing CHD compared to women. In the present study only male CHD patients were selected. Out of 121 male CHD patients admitted in CCU’s of various hospitals in Pune, 81 CHD male patients agreed to participate in the present study. 81 matched normal subjects were selected after the medical check up by the physicians who labelled them as normal as they were not suffering from any disease. The CHD patients and the normal subjects were matched, one to one on the variables of age, education, occupation, family type and socioeconomic status.

The inclusion criteria for the study were as follows: i) Age: 30-60 years, ii) Education: minimum SSC. passed, iii) Occupation: employed, and iv) Socioeconomic status: minimum income INR 1,00,00 per annum.

**Tools:**

**Personal data sheet:** A personal data sheet comprising 12 items was constructed and was required to be filled in by the patients and normals before the actual administration of psychological scales. The items were designed to get the information about age, education, occupation, family type and socioeconomic status.

Following instruments were administered to assess stress, anxiety, type A behaviour pattern and life style: i) Life Change Measure, ii) State Trait Anxiety Inventory, iii) Jenkins Activity Survey. All the above instruments used for research purpose were translated into Marathi (the local language), with forward and backward translations and which finally were approved by psychologists and language teachers. Rationale for the tools used and their descriptions are given below:

**Life Change Measure:** This is a list of 42 life events and is prepared on the basis of Sarason et al’s Life Experience Survey (LES, 1978). In this the respondents are asked to mark the events they have experienced during the past two years only. In the measure, such event can be rated for its positive, negative or no impact according to respondent’s experience. The respondent has to rate the impact on 7-point scale from -3 to +3. In case of no impact ‘0’ (zero) is marked. Scores ‘1’ (one) through ‘3’ (three) indicate ‘slight’, ‘moderate’, and ‘very much’ for the degree of impact as per positive or negative experience of the events.

At the end of the list some blank spaces are provided for the subject to add events which may not have been included in the list but which the respondent might have experienced and found stressful. This measure enables one to get the kind of impact, that is, positive or negative with its degree of stress experienced by the respondent. The test- retest reliability coefficient for this tool was 0.73. The tool is used as a measure of life change in research on life stress.

**State –Trait Anxiety Inventory:** The STAI (self evaluation questionnaire) is comprised of separate self report scales for measuring two distinct anxiety concepts: State Anxiety (A-state) and Trait Anxiety (A-trait).

The STAI trait scale consists of 20 statements that ask people to describe “how they generally feel”. The range of the possible scores for Form –X of the STAI varies from a minimum score of 20 to a maximum score of 80. The STAI state scale consists of 20 statements that ask people to describe, “How they feel right now, that is at this moment”. The range of the possible scores for Form –XI of the STAI varies from a minimum score of 20 to a maximum score of 80. The STAI has been developed and used in 38 language versions all over the world, and therefore, is the most widely used tool for research on anxiety across cultures.

**Jenkins Activity Survey (JAS, Form, C):** This has been constructed by Zyzanski and Rosenman in 1979. Typically this is a self report multiple-choice questionnaire of 52 items designed to measure the risk of CHD. The test is scored on four subscales. There are 52 items in JAS. In scoring key there are four subscales for scoring.

The Type A scale comprising 21 items assesses the multifactor clinical construct of the ‘coronary-prone’ behaviour pattern. The Type-A and three factorial independent components of this broader construct are
Speed and Impatience (comprising 21 items), Job Involvement (comprising 24 items), and Hard Driving and Competitiveness (comprising 20 items). Despite the implication of its name, the JAS is not a measure of physical activity, nor is the JAS a measure of stress, despite the fact that stress is associated in people’s minds with risk of CHD. Form C is the fifth edition of JAS. In general, people having high Type A scores have higher probability of having CHD than people having low Type A scores, assuming other major factors are roughly equivalent in two groups of people.

Two kinds of reliability estimates have been computed for the JAS scales, internal consistency and test retest. The four scales were found to show uniform reliability coefficients, ranging from 0.73 to 0.85.

Operational procedure

All necessary permissions were sought to collect the data of CHD patients from Cardiac Care Unit (CCU) of Pune city. On the initial contact, after noting down residential address of the patients a formal permission was sought to see them at home after discharge from CCU within 10 days. Special visits were made to see the CHD patients to interview and complete the psychological testing part. After explaining the objectives and purpose of the study and establishing proper rapport, the patients of CHD gave written informed consent. All the scales and interview schedule used for this study were given individually to each patient at his residence. All the patients were assured that information given by them would be kept confidential and would be utilized solely for research purpose only. They were also instructed to ask for clarification of any doubtful item, though specific instructions for each scale were printed at the beginning of the scale. No time limit was imposed for the completion of the scales.

Immediately within a week the sample of normals was selected. They also were assessed by psychological tests and interviewed personally by visiting their houses.

RESULTS

Stress among patients of CHD and matched Non-CHD individuals

As proposed in methodology of the study, responses of the patients of CHD and matched normal were analyzed to determine, the degree of stress experienced by using three different modes of scoring as given below: i) By using self ratings of negative events only, ii) By using self ratings of positive events only, and iii) By using life change units (LCU’s) of experienced negative and positive life events together. This was done to see whether or not these different modes of stress assessment give the same results. Accordingly the total stress score for each individual was calculated separately by using each mode of scoring at a time. Therefore, there were three scores for each subject as shown in Table 1.

Table 1: Means, SDs, and ‘t’ ratios on stress for CHD patients and Non-CHD Individuals: (N=162)

<table>
<thead>
<tr>
<th>Stress</th>
<th>CHD patients (N=81)</th>
<th>Non-CHD Individuals (N=81)</th>
<th>T</th>
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<tbody>
<tr>
<td></td>
<td>Mean SD</td>
<td>Mean SD</td>
<td></td>
</tr>
<tr>
<td>Self Ratings of Negative</td>
<td>6.61 5.53</td>
<td>4.43 3.16</td>
<td>3.07**</td>
</tr>
<tr>
<td>Life Events</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Ratings of Positive</td>
<td>3.39 3.26</td>
<td>4.59 3.62</td>
<td>2.26**</td>
</tr>
<tr>
<td>Life Events</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total LCUs</td>
<td>145.31 15.678</td>
<td>95.10 13.89</td>
<td>21.57**</td>
</tr>
<tr>
<td>(Negative and Positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Events)</td>
<td>** P&lt;0.01</td>
<td></td>
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</tbody>
</table>

Mean for self ratings of negative events of CHD patients were M=6.61 and SD=5.53 and for matched Non-CHD individuals M=4.43 and SD =3.16, and t value was 3.07, (p<0.01). Mean for positive events of CHD patients were M=3.39 and SD=3.26 and for matched Non-CHD individuals M=4.59 and SD= 3.62 and t value was 2.26, (p<0.01). Mean for LCUs for negative and positive life events together for CHD patients were M=145.31 and SD= 15.68 and for matched Non-CHD individuals M=95.10 and SD= 13.89 and t value was 21.57 (p<0.01). (Need grammatical correction). These results indicate that CHD patients scored higher on stress as compared to matched Non-CHD individuals.

Anxiety among patients of CHD and matched non-CHD controls

As mentioned earlier anxiety was referred to as A-state anxiety and A-trait anxiety. The results of present study reported higher A-state and A-trait anxiety among CHD patients as compared to matched normal.
As shown in Table 2, CHD patients have been reported to be more anxious than the matched normal. Mean for CHD patients on A-state anxiety was M=50.00 and SD=5.71 and for matched Non-CHD individuals M=35.00 and SD=5.11, and t value was 15.78, (p<0.01). This result indicates that patients of Coronary Heart Disease (CHD) scored higher on a state anxiety than matched Non –CHD individuals. So hypothesis number two, “Patients of CHD would score higher on state anxiety (A- State) as compared to matched Non-CHD individuals” is verified.

Mean for CHD patients on trait anxiety (A-trait) was M=51.00 and SD= 4.82 and for matched Non-CHD individuals M=36.00 and SD= 4.32, and t value was 21.12 (p< 0.01). This result indicates that the patients of CHD scored higher on trait anxiety (A- trait). So the hypothesis number three, “Patients of Coronary Heart Disease (CHD) would score higher on trait anxiety (A-trait) as compared to matched Non-CHD individuals” was verified.

**Type-A behaviour pattern for CHD patients and non-CHD individuals**

The results of present study indicate that the mean differences were statistically significant for Type –A behaviour, Factor S, Factor J and Factor H (Table 3). The patients of CHD showed consistently higher scores on Type-A behaviour pattern as compared to the matched Non-CHD individuals. As mentioned earlier type-A behaviour pattern is a set of habits that includes type-A behaviour, speed and impatience (factor- S), job involvement (factor- J), and hard driving and competitiveness (factor- H). In the present study mean for CHD patients on type-A behaviour was M=11.35 and SD= 3.42 and mean for matched Non-CHD individuals was M=3.56 and SD= 3.42, and t value was 8.78 (p< 0.01). This result indicates that the patients of CHD scored higher on type-A behaviour. So hypothesis, “Patients of Coronary Heart Disease (CHD) would score higher on type –A behaviour as compared to matched Non-CHD individuals” was verified.

Mean for CHD patients on speed and impatience (factor- S) was M=7.67 and SD= 3.91 and the mean for matched Non-CHD individuals was M=2.56 and SD =1.26 and t value was 10.97 (p< 0.01). This result indicates that the patients of CHD scored higher on speed and impatience (factor- S). So hypothesis number five, “Patients of Coronary Heart Disease (CHD) would score higher on speed and impatience (factor- S) as compared to matched Non-CHD individuals” was verified. Thus it shows that CHD Patients are characterized by higher speed and impatience compared to the normals. Mean for CHD patients on job involvement (factor- J) was M=7.77 and SD= 4.51, and for matched Non-CHD individuals M=2.68 and SD =1.15, and t value was 9.82 (p< 0.01). This result shows that the patients of CHD scored higher on job involvement (factor- J ).So hypothesis number six, “Patients of Coronary Heart Disease (CHD) would score higher on job involvement (factor- J ) as compared to matched Non-CHD individuals” was verified. Thus it shows that CHD patients are characterized by higher job involvement compared to the normals.

Means for CHD patients on hard driving and competitiveness (factor-H) was M=9.42 and SD= 2.98 and for matched Non-CHD individuals M=2.31 and SD =1.01 and t value was 20.58 (p< 0.01). This result indicates that the patients of CHD scored higher on hard driving and competitiveness (factor-H). So hypothesis number seven, “Patients of Coronary Heart Disease (CHD) would score higher on hard driving and competitiveness (factor-H) as compared to matched Non-CHD individuals” was verified. Thus it shows that CHD patients are characterized by higher hard driving and competitiveness compared to the normals.
DISCUSSION

The results show that patients with high degree of stress experienced negative life events substantially threatening as compared to the matched normal. Experience of positive events is less in case of CHD patients as compared to matched normals. This can be interpreted with reference to experience of large number of life changes. [16] Rahe (1972) noted that grater magnitude of life changes indicated grater possibility of disease onset in the near future which supports the findings of the present study. [17] Ahmad and Bhopal (2001) studied the impact of desirable and undesirable events on health. They found that undesirable events contributed more to the stress-strain relationship than the desirable once. [18] In 1988, the National Heart Foundation of Australia published a report," Stress and Cardiovascular Disease" which concluded that stress has predicted the subsequent development of CHD. Rissam et al (1991), [21] have demonstrated that middle-aged men with high levels of self-perceived psychological stress have up to a 50 percent higher incidence rate of coronary artery disease compared to others. [19] Various studies showed that stress induces significant increments in CHD. [18] To summarize, it may be said that the high stress experience is associated with CHD, whereas low stress is associated with ‘normal’ cardiac health.

The role of anxiety in CHD has also been widely documented in Western as well as Indian studies. A prospective examination of anxiety and CHD risk in health professionals follow up study found that CHD is more common among men with high anxiety level compared to those men who report no anxiety symptoms. [20] The role of state anxiety (A-state) and trait anxiety (A-trait) in CHD has also been demonstrated in few studies. Reddy reported that anxiety was highly associated with heart disease as compare to other psychosomatic conditions. [8] Some investigators explored association of anxiety in other psycho physiological disorders. As compared to controls, relatively higher trait anxiety was found in chronic pain, angina pectoris and CHD patients. It has been noted that appraisal of situation affects the perception and experience of situations of life. How one appraises the situation is very well determined by personality disposition like anxiety. [21] According to some studies anxiety is a basic cause of stress and it is not only symptom or manifestation of stress, but also a cause of further stress. Shejwal also noted that the high stress group was more prone to stress experiences due to their high anxious nature as compared to the low stress group. [13] The findings of the present study are consistent with the earlier findings on anxiety variable. As compared to normal relatively higher state anxiety (A-state) and trait anxiety (A-trait) was found in CHD patients. [22]

Number of investigations has attempted to show a relationship between type-A behaviour pattern and CHD. Type-A individuals tend to become excessively aroused physiologically when they are placed in stressful situations. This arousal in turn results in increased heart rate and blood pressure. Such exaggerated physiological responsivity ultimately produces an increased incidence of coronary heart disease. [23] The type-A behaviour pattern emerged as a significant risk factor for the subsequent development of CHD, especially angina related coronary disease. [24] In recent years, researchers have found a strong link between personality and coronary risk by focusing on a specific component of type-A personality that is anger and hostility. [25] Verghese et al found an elevated incidence of heart attacks among patients who exhibited an angry temperament and time urgency which showed that there was a positive association between type-a behaviour pattern and CHD in Indian patients. [7] The findings of the present study are consistent with the earlier findings on type-A behaviour pattern. The earlier research has been carried out on men, and showed it at rates of coronary heart disease are significantly higher for males than for females. [26] Type-A behaviour pattern was associated with life style, cultural norms of society including achievement at work place and the importance of work ethics. [27] Some studies have found an association between hard driving, competitiveness and job involvement and cardiovascular disease. These findings suggest that competitiveness and hostility may be the crucial toxic elements in the type-A syndrome that accounts for the correlation between type-A behaviour and heart disease. [28]

CONCLUSIONS

To summarise, the patients with CHD have significantly greater scores on anxiety than the matched normals, indicating that anxiety is one of the significant contributing factors in the development of heart disease. Also, there are significant differences between patients with CHD and matched Non-CHD individuals on all three measures of stress experience. On state anxiety (A-state) and trait anxiety (A-trait) patients of CHD scored higher as compared to matched non-CHD individuals. On type-A behaviour pattern CHD male patients scored higher as compared to non-CHD individuals. Hence, interventions aiming at anxiety reduction and stress management may help patients diagnosed with CHD. Such measures may also have a protective effect in individuals who are prone to CHD.

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References


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