Original Research Article

Effect of stress on hypertension among professional groups at Bareilly: a cross sectional study

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ABSTRACT

**Background:** The objective of the present study was to study the effect of stress on hypertension in various professional groups.

**Methods:** A cross sectional study was done from 1st August 2015 to 30th August 2017 in district Bareilly. A predesigned and pretested questionnaire was used comprising of demographic data and stress. Three types of professionals were included in this study: doctors, managerial staff and school teachers from the teaching institutions.

**Results:** This study showed association of hypertension with stress level and found that 24.62% doctors, 72.31% school teachers and 27.69% managerial staff were hypertensive with mild stress level. Among all study subjects 41.54% were hypertensive with moderate stress level. 15.38% doctors, 10.77% school teachers and 46.92% managerial staff were hypertensive with severe stress level. Among all study subjects 18.46% were hypertensive with severe stress level. Chi-square test for association was applied and p-value was found significant for doctors, managerial staff and insignificant in school teachers. Among all study subjects p value 0.016 was found significant.

**Conclusions:** The present study showed highly significant association for hypertension with stress level among doctors and managerial staff with p value (0.005) and (0.001).

**Keywords:** Hypertension, Stress, Doctors, Teachers, Managerial staff

INTRODUCTION

Hypertension also known as high or raised blood pressure is a global public health issue. It is a major risk factor for stroke and coronary heart diseases and is a major contributor to the onset and progression of chronic heart failure and chronic kidney failure. Blood pressure is the force of blood pushing against the walls of arteries as flows through them. Blood pressure is highest when the heart beats to push out blood into the arteries (systolic blood pressure) and when the heart relaxes to fill with blood again the pressure is at its lowest point (diastolic blood pressure). The global prevalence of raised blood pressure defined as systolic and/or diastolic blood pressure ≥140/90 mmHg in adults aged 18 years and over was around 22% in 2014. In India, hypertension is the leading non communicable disease risk and estimated to be attributable for nearly 10 per cent of all deaths. Adult hypertension prevalence has risen dramatically over the past three decades from 5 per cent to between 20-40 per cent in urban areas and 12-17 per cent in rural areas. The number of hypertensive individuals is anticipated to nearly double from 118 million in 2000 to 213 million by 2025. High blood pressure is increasing in India due to rapid urbanization and globalization leading to adoption...
of unhealthy lifestyles. Many people are unaware that they have high blood pressure and remain undiagnosed. Even the majority of those who are diagnosed do not get treated to control the blood pressure. It became evident in early 1970s that only about half of the hypertensive subjects in the general population of most developed countries were aware of the condition only about half of those aware of the problem were being treated and only about half of those treated were considered adequately treated. Stress has become a public health menace of the day. It cannot be eliminated from life and it's absolutely essential that we learn to manage it. Stress management is of special relevance to doctors who encounter extreme challenges in their professional and personal life. It will pave the way for working out appropriate coping strategies and interventions.

Decreased physical activities coupled with increased mental tension are important contributors. Several studies have shown that lifestyle factors have their significant role in causing hypertension in professionals. Keeping this in view the present study was done to study the impact of stress on hypertension among three professional groups, doctors, school teachers and managerial staff of Bareilly, Uttar Pradesh.

**METHODS**

**Study design**

It is a cross sectional study done in three professional groups; doctors, school teachers and managerial staffs.

**Study period**

The total study period was two year from 1st August 2015 to 30th August 2017.

**Study tool**

A predesigned and pretested questionnaire comprising of demographic data and mental stress was prepared in English language after reviewing the available literature; however questions were asked in local language at the time of interview after obtaining verbal consent.

**Table 1: Classification of Blood pressure (BP).**

| BP classification | SBP (mmHg) | DBP (mmHg) |
|--------------------|------------|------------|
| Normal             | <120       | <80        |
| Prehypertension    | 120-139    | 80-89      |
| Stage 1 hypertension | 140-159    | 90-99      |
| Stage 2 hypertension | ≥160       | ≥100       |

**Table 2: Mental stress was assessed by using Holmes and Rahe stress inventory scale.**

| Holmes and Rahe stress inventory scale for assessing mental stress | Mean value |
|-------------------------------------------------------------------|------------|
| Death of spouse                                                   | 100        |
| Divorce                                                           | 73         |
| Marital separation                                                | 65         |
| Detention in jail or other institution                            | 63         |
| Death of a close family member                                    | 63         |
| Major persona injury or illness                                   | 53         |
| Marriage                                                          | 50         |
| Being fired at work                                               | 47         |
| Marital reconciliation with mate                                  | 45         |
| Retirement from work                                             | 45         |
| Major change in the health or behavior                            | 44         |

Continued.
**Holmes and Rahe stress inventory scale for assessing mental stress**

| Event                                                                 | Mean value |
|-----------------------------------------------------------------------|------------|
| Pregnancy                                                             | 40         |
| Sexual difficulties                                                   | 39         |
| Gaining a new family member (i.e., birth, adoption, older adult moving etc.) | 39         |
| Major business readjustment                                           | 39         |
| Major change in financial state(i.e., a lot worse or better off than usual) | 38         |
| Death of a close friend                                               | 37         |
| Changing to a different line of work                                  | 36         |
| Major change in the no of arguments with spouse                       | 35         |
| Taking on a mortgage (for home, business)                             | 31         |
| Foreclosure on a mortgage or loan                                     | 30         |
| Major change in responsibilities at work (promotion, demotion)        | 29         |
| Son or daughter leaving home(marriage, attending college, joined military) | 29         |
| In law troubles                                                       | 29         |
| Outstanding personal achievement                                      | 28         |
| Spouse beginning or ceasing work outside the home                     | 26         |
| Beginning or ceasing formal schooling                                 | 26         |
| Major change in living condition (new home, remodeling, deterioration of neighborhood or home) | 25         |
| Revision of personal habits                                           | 24         |
| Trouble with the boss                                                 | 23         |
| Major changes in work hours or conditions                             | 20         |
| Changes in residence                                                  | 20         |
| Changing to a new school                                              | 20         |
| Major change in usual type and/or amount of recreation                | 19         |
| Major change in church activity (i.e. a lot or less than usual)       | 19         |
| Major change in social activities(club, movies, visiting)             | 18         |
| Taking on a loan (car, freezer, etc.)                                 | 17         |
| Major change in sleeping habits(a lot more or a less than usual)      | 16         |
| Major change in number of family get together                         | 15         |
| Major change in eating habits(a lot more or a lot less than usual)     | 15         |
| Vacation                                                              | 13         |
| Major holidays                                                        | 12         |
| Minor violations of the law (traffic, tickets, jaywalking, disturbing the peace, etc) | 11         |
| **Total**                                                             | **1372**   |

Blood pressure was measured using standard protocol. The auscultatory method of BP measurement with a calibrated and validated manual mercury sphygmomanometer was used. An adult sized cuff bladder was used to ensure accuracy. Subjects were asked to be seated quietly for at least 5 minutes in a chair with feet on the floor, and arm supported at heart level. The systolic and diastolic pressures were measured three times over a period of at least 3 minutes and the lowest reading was recorded. Hypertension was diagnosed using JNC 7 criteria.²

**RESULTS**

Table 3 shows the distribution of socio-demographic variables in which majority of subjects were belonging to age group of 30-40 years (47.43%) followed by age groups 20-30 years (22.30%), 40-50 years (18.20%) and >50 years (12.07%). Distribution of nuclear and joint family is 68.97% and 31.03% respectively in the study. Males contributed 78.46%, while 21.53% were females in the study population. Majority of the study subjects 93.08% belonged to Hindu religion followed by Muslim, Sikh and other population those were 4.11%, 2.30% and 0.51% respectively. Majority of subjects in the study were from general caste (58.20%) followed by OBC (38.97%), SC (2.57%) and ST (0.26%) Education profile showed that majority of the study subjects was educated up to postgraduate level 72.82% while remaining subjects were graduate 27.18%. Majority of the study population 64.61% belonged to socioeconomic upper class, followed...
by 23.34% in middle class, 11.29% in upper middle, 0.76% in lower middle class.

Table 4 shows stress level among doctors, school teachers and managerial staff (stress level was assessed by a scoring system suggested by Holmes and Rahe stress inventory scale). Majority of school teachers (84.62%) were found mildly stressed followed by managerial staff (30.77%) and doctors (24.62%).

Table 3: Distribution of study subjects according to their sociodemographic characteristics (n=390).

| Socio-demographic variables | Frequency (N) | Percentage (%) |
|-----------------------------|----------------|----------------|
| **Age distribution (in years)** | | |
| 20-30 | 87 | 22.30 |
| 30-40 | 185 | 47.43 |
| 40-50 | 71 | 18.20 |
| >50 | 47 | 12.07 |
| **Status of family** | | |
| Nuclear | 269 | 68.97 |
| Joint | 121 | 31.03 |
| **Sex** | | |
| Male | 306 | 78.46 |
| Female | 84 | 21.53 |
| **Religion** | | |
| Hindu | 363 | 93.08 |
| Muslim | 16 | 4.11 |
| Sikh | 9 | 2.30 |
| Others | 2 | 0.51 |
| **Caste** | | |
| General | 227 | 58.20 |
| OBC | 152 | 38.97 |
| SC | 10 | 2.57 |
| ST | 1 | 0.26 |
| **Educational status** | | |
| Graduate | 106 | 27.18 |
| Postgraduate | 284 | 72.82 |
| **Socio-economic class** | | |
| Upper class | 252 | 64.61 |
| Upper middle class | 44 | 11.29 |
| Middle class | 91 | 23.34 |
| Lower middle class | 3 | 0.76 |
| Lower class | 0 | 0 |

Table 4: Stress level among doctors, school teachers and managerial staff (n=390).

| Stress level (score) | Doctors | School teacher | Managerial staff | Total |
|----------------------|---------|----------------|------------------|-------|
| No significant problem (0-149) | N (%) | N (%) | N (%) | N (%) |
| Mild (150-199) | 32 (24.62) | 110 (84.62) | 40 (30.77) | 182 (46.67) |
| Moderate (200-299) | 27 (20.77) | 17 (13.08) | 69 (53.08) | 113 (28.98) |
| Severe (>300) | 71 (54.61) | 3 (2.30) | 21 (16.15) | 95 (24.35) |
| Total | 130 | 130 | 130 | 390 |

\( \chi^2 = 179.528 \)

\( \text{df} = 4 \)

\( \text{P value} < 0.001 \)

Table 5 shows association among the doctors, school teachers and managerial staff according to their stress level and found that mild stress level among professional groups and found 24.62% doctors, 72.31% school teachers and 27.69% managerial staff were hypertensive with mild stress level. Among all study subjects 41.54% were hypertensive with mild stress level. 15.38% doctors, 10.77% school teachers and 46.92% managerial staff were hypertensive with moderate stress level. Among all study subjects 24.36% were hypertensive with moderate stress level. 46.15% doctors, 0.76% school teachers and 8.46% managerial staff were hypertensive with severe stress level.
stress level. Among all study subjects 18.46% were hypertensive with severe stress level. A \( \chi^2 \) test for association was applied and \( p \) value was found significant for doctors, managerial staff and insignificant in school teachers. Among all study subjects \( p \) value 0.016 was found significant.

Table 5: Association of hypertension with stress level among various professional groups (n=390).

| Stress level | Doctors | School teacher | Managerial staff | Total |
|--------------|---------|----------------|------------------|-------|
|              | HTN     | Non HTN        | HTN              | Non HTN | HTN     | Non HTN | HTN     | Non HTN |
| Mild         | 32 (24.62) | 0 (0)      | 94 (72.31)     | 16 (12.31) | 36 (27.69) | 4 (3.08) | 162 (41.54) | 20 (5.13) |
| Moderate     | 20 (15.38) | 7 (5.39)     | 14 (10.77)     | 3 (2.31)   | 61 (46.92) | 8 (6.16) | 95 (24.36)  | 18 (4.62)  |
| Severe       | 60 (46.15) | 11 (8.46)    | 1 (0.76)       | 2 (1.54)   | 11 (8.46)  | 10 (7.69) | 72 (18.46)  | 23 (5.89)  |
| Total        | 112 (86.15) | 18 (13.85)   | 109 (83.85)    | 21 (16.15) | 108 (83.08) | 22 (16.92) | 329 (84.36) | 61 (15.64) |
| \( \chi^2 \) | 8.607    | 5.890         | 16.831          | 8.280      |
| \( df \)     | 2        | 2             | 2               | 2          |
| \( p \) value | 0.014    | <0.001        | 0.016           |

DISCUSSION

In the present study majority of the study population (64.61%) belonged to socioeconomic upper class, followed by 23.34% in middle class, 11.29% in upper middle class, and 0.76% in lower middle class which is comparable to Mendez et al (2003) reported in a cross sectional study to examine the association between socioeconomic status and hypertension (SBP ≥140/ DBP ≥90 mm Hg) in 2082 adults in Jamaica.\(^7\) The income distribution of BP and hypertension were non-linear and moreover, the hypertension was found to be the highest in wealthiest women. In men with same high school education, income was positively associated with BP whereas Ribet et al reported a study analyzed the relationship between major cardiovascular risk factors in French men (aged 40-50 years) and their spouse’s occupational category.\(^8\) Spouse’s occupational category was independently associated with men’s hypertension.

The present study showed stress level among doctors, school teachers and managerial staff and found that in mild category, majority (84.62) were school teachers followed by managerial staff (30.77%) and (24.62%) in doctors. In moderate category maximum stress level (53.08%) was found in managerial staff followed by in doctors (20.77%) and 13.08% in school teachers. In severe category majority (54.61%) were doctors followed by 16.15% in managerial staff and 2.30% in school teachers. By applying Chi-square test for association \( p \) value <0.001 was found highly significant which is comparable to study of Cesana et al studied the association between job strain and blood pressure in four population samples of age 25 to 54 years from northern Italy.\(^9\) Among men there was a 3 mmHg increase of systolic blood pressure (p<0.001) moving from low to high strain job categories. Nakanishi et al showed the association of long working hours with the risk of hypertension in men (35-54 years) and reported the relative risk of Hypertension above the borderline levels to be 0.63 in subjects working <8.0 hours/day.\(^10\)

CONCLUSION

The present study showed highly significant association for hypertension with stress level among doctors and managerial staff with \( p \) value (0.005) and (0.001). The odds of developing high blood pressure and its adverse consequences in professional groups can be minimized by management of stress by recreational activities, meditation and yoga.

Individuals who already have hypertension can actively participate in managing their condition by, adopting the healthy behaviors such as monitoring blood pressure at regular intervals at home if feasible, checking blood sugar and blood cholesterol and urine albumin twice a year, following medical advice and prescribed medications for lowering blood pressure.

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