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EVALUATING THE POTENTIAL CAUSAL ROLE OF STRESS IN THE HIGH INCIDENCE OF HYPERTENSION AND DIABETES AND THE LOW INCIDENCE OF ASTHMA

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ABSTRACT

Background: Predisposing factors for stroke, heart disease, and mortality, diabetes and hypertension are major worldwide health burdens, especially in India. The socioeconomic position of Indian individuals is also linked to increased levels of stress among them.

Aim: The purpose of the current study was to evaluate the potential causal relationship between stress and the low prevalence of asthma and the high incidence of diabetes and hypertension.

Methods: A total of 250 visitors to the Indian medical facility were evaluated for the study. The prevalence of diabetes, hypertension, and asthma was evaluated in addition to the individuals' awareness of the illnesses and their understanding of how to manage them. The individuals' experiences with stress and the kinds of stress they faced were also evaluated.

Results: The research's findings revealed that hypertension was documented in 46.8% (n=117) of study participants with the highest incidence in the age range of individuals older than 40 years, and diabetes was common in 12% (n=30) of study subjects with the highest prevalence in the 40–60 year age range. Asthma incidence was reduced across all age groups. Of the 150 research participants, 60% reported having a stressful existence.

Conclusion: Indian citizens have a high incidence of both hypertension and diabetes. Nonetheless, the prevalence of asthma is minimal, and a significant proportion of those afflicted remain oblivious to their diabetes and hypertension conditions.

Keywords: Asthma, Diabetes, Hypertension, Stress, morbidity

The high occurrence of these morbid illnesses among Indian populations can be attributed in large part to their everyday exposure to stress.

INTRODUCTION

Hypertension is a non-communicable illness that is highly prevalent worldwide and causes a significant number of deaths and disabilities each year. Nearly 20% of people worldwide suffer from hypertension, which is still a major risk factor for stroke and other heart conditions with an average blood pressure of 140/90 mmHg or above. Despite efforts to manage blood pressure, the incidence of hypertension is anticipated to continue rising internationally over the next ten years. particularly among participants from affluent nations because of improved methods for diagnosis

and treatment. In 2015, there were 10.7 million deaths and 211.8 million life years with a disability attributed to hypertension worldwide.¹

Additionally, the prevalence of diabetes in young and middle-aged individuals is increasing worldwide, leading to additional consequences from the disease that can be fatal and require immediate medical attention. With improved diabetes and blood sugar management, these consequences can be postponed or avoided. Recently, research on the literature has concentrated on evaluating the effect of stress in diabetics and how it affects the individuals' long-term survival rates after the beginning of the condition. On the other hand, there is a dearth of information in the literature about the impact of chronic stress exposure on diabetes individuals' mortality.²

Additional chronic illnesses that impact a significant portion of the world's population, including India, include bronchial asthma and chronic obstructive pulmonary disease (COPD). These two illnesses are crippling ailments that impact the lungs. Children are most affected by asthma worldwide, and it is a serious health issue for them. According to estimates from the WHO, around 235 million people worldwide suffer with asthma.³

These figures, however, are thought to be overestimated since many individuals with asthma go misdiagnosed and untreated. The exact aetiology of asthma is unknown. However, the aetiology of asthma has been linked to a number of factors, including air pollution, passive and active tobacco smoke, carpet pollens, cockroaches, house dust mites, and other environmental factors. Airway inflammation can result from environmental exposure or genetic predisposition.⁴

For most subjects, stress is a significant aspect of daily life and has varying effects on a broad population. People frequently experience stress at some point in their lives. That being said, there is inter-individual variance in the ways that different people handle stress. Anger and frustration are the primary emotions that define stress, however it can also manifest as a variety of other psychological or physical symptoms. To a certain degree, stress may be advantageous since it can aid those who experience it in completing different jobs and handling diverse circumstances. Furthermore, it has been shown that high levels of stress can exacerbate a number of illnesses and result in distinct medical scenarios.⁵

The current study sought to determine the prevalence of diabetes, hypertension, and asthma among Indian population as well as how these conditions related to control, awareness, and the age of the affected individuals. The study also sought to determine whether these pathological illnesses and the stress levels that people faced in their regular lives were related.

The study contributes to the present understanding of illness incidence in Indian people by elucidating these relationships.

MATERIALS AND METHODS

The current study sought to determine the prevalence of diabetes, hypertension, and asthma among Indian participants as well as how these conditions related to control, awareness, and the age of the affected individuals. The study also sought to determine whether these pathological illnesses and the stress levels that people faced in their regular lives were related. The patients who came to the Institute's outpatient department made up the study population. Written and verbal informed permission was obtained from every research participant.

A total of 250 male individuals with comorbid conditions such as asthma, diabetes, and hypertension who were between the ages of 18 and 60 were included in the study. In order to rule out complicating variables such as pregnancy and hormone fluctuations, the research exclusively recruited male participants. A specialist in the subject who was male collected all the study data. Subjects less than eighteen years of age were also excluded. In order to be included in the trial, individuals had to have a history of asthma, be on bronchodilators or steroids often, and be prescribed NSAIDs. The diabetics were recognized if they had previously taken blood glucose monitoring, had disclosed diabetes in order to get alternative therapy, or had come in for the purpose of repeating an anti-diabetic medication.

If participants reported having hypertension in order to get alternative therapy, were taking blood pressure medication prior to the consultation, or were on antihypertensive medication repeatedly, hypertension was recognized.

Following the final patients' enrollment in the research, each subject's complete health history was documented, and the incidence rates of diabetes, hypertension, and asthma were then evaluated. The number of cases for each age group divided by the total population was used to get the incidence percentage, which was 100%. The number of instances in each age group divided by the total population X 100,000 was used to get the crude incidence rate. The age distribution of the standard population X crude rate was used to get the age-adjusted incidence rate. SPSS software version 21.0 was used to statistically analyze the collected data. The data were expressed as percentages and frequencies. The p-value of <0.05 was considered statistically significant.

RESULTS

The current study sought to determine the prevalence of diabetes, hypertension, and asthma among Indian participants as well as how these conditions related to control, awareness, and the age of the affected individuals. The study also sought to determine whether these pathological illnesses and the stress levels that people faced in their regular lives were related. The bulk of research participants were between the ages of 40 and 60, including 36% (n = 90) of the sample, 34.4% (n = 86) of the sample from the 18 to 39 age group, and at least 29.6% (n = 74) of the sample from the >60 age group. In the current study, there were no female participants and 250 men (n = 1).

According to the age range of the research participants, 51, 23, and 3 individuals, respectively, from 18–39, 40–60, and >60 years old, made up 30.8% (n=77) of the subjects who were single. of age, and 69.2% (n=173) of the subjects were married, with 35, 67, and 71 subjects, correspondingly, belonging to the ages of 18–39, 40–60, and >60. While 44% (n=110) of the study subjects were from rural areas, with 40, 41, and 29 subjects respectively from 18-39, 40-59, and >60 years of age, the majority of the subjects were from urban areas, with 56% (n=140) having 46, 49, and 45 subjects from 18-39, 40-59, and >60 years of age (Table 2).

Upon evaluating the comorbid conditions of the research participants based on their age range, it was observed that 3.48% (n=3), 9.30% (n=8), and 24.41% (n=21) of the individuals had asthma, diabetes, and hypertension, respectively. In the 40–60 age range, 3.33% (n=3), 14.44% (n=13), and 60% (n=54) of study participants reported having asthma, diabetes, or hypertension, respectively. Table 3 shows the incidence of diabetes, hypertension, and asthma among study participants 60 years of age and older. The rates of 2.70% (n = 2), 14.86% (n = 11), and 59.45% (n = 44) respectively.

Among those with hypertension between the ages of 18 and 39, 24.41% (n = 21) did not know their status, and 2.32% (n = 2) had uncontrolled, non-drug, and drug-controlled states, which were observed in 11.62% (n = 10) and 61.62% (n = 53) of the subjects, respectively, according to the study's classification of participants based on awareness of disease control.

The research participants who were uninformed, uncontrolled, non-drug, and drug-controlled were 22.2% (n = 20), 14.4% (n = 13), 52.2% (n = 47), and 11.1% (n = 10) between the ages of 40 and 60. The percentages of individuals over 60 who were uneducated, uncontrolled, drug-free, and drug-controlled are shown in Table 4 as follows: 5.40% (n = 4), 16.21% (n = 12), 66.21% (n = 49), and 12.16% (n = 9).

In terms of diabetes control awareness, the sample consisted of 17.44% (n = 15) of respondents from the 18–39, 40–60, and >60 age groups, respectively. In the age ranges of 18–39, 40–60, and >60, respectively, 10.46% (n=9), 20% (n=18), and 24.32% (n=18) of the patients had uncontrolled diabetes mellitus. 50% (n = 43), 53.3% (n = 48), and 62.16% (n = 46) of research participants in the 18–39, 40–60, and >60 age groups, respectively, had drug-controlled diabetes mellitus. Table 4 shows that 22.09% (n=19), 14.44% (n=13), and 9.45% (n=7) of research participants had non-drug-controlled diabetic mellitus.

The results of the evaluation of the number of comorbidities in the research subjects based on their age distribution are summarised in Table 5. In the age range of 18–39 years, comorbidities such as diabetes/asthma, hypertension/diabetes, and hypertension/diabetes/asthma were seen in 5, 4, 5, and 3 subjects, respectively.

Comorbidities such as hypertension and diabetes, hypertension and asthma, diabetes and asthma, and hypertension and diabetes and asthma were noted in 20, 8, 13, and 2 participants in the 40–60 age group, respectively. Table 5 shows that among participants over 60, 30, 8, 8, and 1 had hypertension/diabetes, hypertension/asthma, diabetes/asthma, and hypertension/diabetes/asthma, respectively.

DISCUSSION

The bulk of study participants in this investigation were between the ages of 40 and 60, comprising 36% (n = 90) of the sample and 34.4% (n = 86) of the sample who were between the ages of 18 and 39 and least 29.6% (n=74)

subjects from >60 years of age. In this study, there were no female participants and 250 men, or 100% of the total. 69.2% (n=173) of the study subjects were married, with 35, 67, and 71 subjects from the age range of 18–39, 40–60, and >60, respectively. 30.8% (n=77) of the subjects were single. In that case, there were 51, 23, and 3 subjects from the 18–39, 40–60, and >60 years of age, respectively.

Urban residents made up the majority of the study subjects (n = 140), with 56% of the subjects having ages ranging from 18 to 39, 40 to 59, and >60, respectively. In contrast, 44% of the subjects (n = 110) were from rural areas, with ages ranging from 18 to 39, 40 to 59, and >60, respectively. These findings were similar to the studies of Persson R et al⁶ in 2021 and Petri D et al⁷ in 2021 where authors assessed subjects with demographic data comparable to the present study.

According to the age range of the study participants, the comorbid status revealed that asthma, diabetes, and hypertension were seen in 3.48% (n = 3), 9.30% (n = 8), and 24.41% (n = 21) of the study subjects, respectively.

Asthma, diabetes, and hypertension were reported in 3.33% (n=3), 14.44% (n=13), and 60% (n=54) of study participants in the 40–60 age group, respectively. Asthma, diabetes, and hypertension were seen in 2.70 percent (n = 2), 14.86 percent (n = 11), and 59.45 percent (n = 44) of the research participants who were above the age of 60. These findings were in line with research conducted by Vink NM et al. in 2013 and Lehrer P et al. in 2002, whose authors observed a similar prevalence of these disorders with ageing to that of the current study.

It was seen that concerning the classification of study participants based on awareness for control of the diseases, In the case of hypertension, among participants aged 18 to 39, 24.41% (n = 21) did not know their status, 2.32% (n = 2) had uncontrolled, non-drug, and drug-controlled states, which were seen in 11.62% (n = 10) and 61.62% (n = 53) of the participants, respectively. Between the ages of 40 and 60, the percentage of study participants who were ignorant, uncontrolled, non-drug, and drug-controlled were 22.2% (n = 20), 14.4% (n = 13), 52.2% (n = 47), and 11.1% (n = 10). Over 60-year-old participants showed drug-controlled, drug-free, unaware, and 16.21% (n=12), 66.21% (n=49), and 12.16% (n=9) status, in that order. These findings corroborated those of Chen E et al. (2007) and Sutherland ER et al. (2003), whose authors found a comparable degree of awareness to that of the current study in their separate investigations.

Regarding diabetes control knowledge, it was shown that, among participants aged 18–39, 40–60, and above 60, respectively, 17.44% (n = 15), 12.22% (n = 11), and 4.05% (n = 3) were not aware that they had diabetes. 10.46% (n=9), 20% (n=18), and 24.32% (n=18) of the participants from the age groups of 18–39, 40–60, and >60, respectively, had uncontrolled diabetes mellitus. Drug-controlled diabetes mellitus was observed in 50% (n=43), 53.3% (n=48), and 62.16% (n=46) of study subjects from the ages of 18–39, 40–60, and >60, respectively. Non-drug-controlled diabetes mellitus was observed in 22.09% (n=19), 14.44% (n=13), and 9.45% (n=7) study subjects, respectively.

These findings were consistent with those of Marin TJ et al. (2009) and Fei G et al. (2004), who observed that their research subjects had comparable levels of diabetes awareness depending on age ranges. According to the study findings, comorbidities such as diabetes/asthma, hypertension/diabetes, and hypertension/diabetes/asthma were seen in 5, 4, 5, and 3 participants, respectively, in the 18–39 age group.

Comorbidities such as diabetes/asthma, hypertension/diabetes, and hypertension/diabetes/asthma were noted in 20, 8, 13, and 2 individuals, respectively, in the 40–60 age group. The following combinations of conditions were seen in persons over 60: hypertension/diabetes, diabetes/asthma, hypertension/diabetes/asthma, and 30, 8, 8, and 1 subject, respectively.

These findings aligned with the research conducted by Shin YS et al. (2014) and Longo M et al. (2019), who proposed a comparable prevalence of multiple comorbid diseases to that seen in the current investigation.

CONCLUSION

Taking into account its limitations, the current study comes to the conclusion that Indian persons have a high incidence of both diabetes and hypertension. Nonetheless, the prevalence of asthma is minimal, and a significant proportion of those afflicted remain oblivious to their diabetes and hypertension conditions. The high occurrence of these morbid illnesses among Indian populations can be attributed in large part to their everyday exposure to stress.

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TABLES

S. No	Characteristics	Number (n)	Percentage (%)
1.	Age range (years)		
a)	18-39	86	34.4
b)	40-60	90	36
c)	>60	74	29.6
2.	Gender		
a)	Males	250	100
b)	Females	0	0

Table 1: Age and gender distribution in the study subjects

S. No	Characteristic	Age range (years)			Number (n)	Percentage (%)
		18-39	40-59	>60		
1.	Marital status					
a)	Single	51	23	3	77	30.8
b)	Married	35	67	71	173	69.2
2.	Residence					
a)	Rural	40	41	29	110	44
b)	Urban	46	49	45	140	56

Table 2: Age-related distribution of different demographic data in the study participants

S. No	Comorbid state	Age-based incidence		
		18-39 % (n=86)	40-60 % (n=90)	>60 % (n=74)
1.	Asthma	3.48 (3)	3.33 (3)	2.70 (2)
2.	Diabetes	9.30 (8)	14.44 (13)	14.86 (11)
3.	Hypertension	24.41 (21)	60 (54)	59.45 (44)

Table 3: Incidence of Asthma, diabetes, and hypertension in the study subjects

S. No	Age range (years)	Unaware % (n)	Controlled		Uncontrolled % (n)
			Non-drug % (n)	Drug % (n)	
1.	Hypertension				
a)	18-39 (n=86)	24.41 (21)	11.62 (10)	61.62 (53)	2.32 (2)
b)	40-60 (n=90)	22.2 (20)	14.4 (13)	52.2 (47)	11.1 (10)
c)	>60 (n=74)	5.40 (4)	16.21 (12)	66.21 (49)	12.16 (9)
2.	Diabetes				
a)	18-39 (n=86)	17.44 (15)	22.09 (19)	50 (43)	10.46 (9)
b)	40-60 (n=90)	12.22 (11)	14.44 (13)	53.3 (48)	20 (18)
c)	>60 (n=74)	4.05 (3)	9.45 (7)	62.16 (46)	24.32 (18)

Table 4: Classification of study participants based on awareness for control of the diseases

S. No	Age range (years)	Hypertension/ Diabetes	Hypertension/ asthma	Diabetes/Asthma	Hypertension/ diabetes/ asthma
1.	18-39 (n=86)	5	4	5	3
2.	40-60 (n=90)	20	8	13	2
3.	>60 (n=74)	30	8	8	1

Table 5: Study subjects with comorbidities of hypertension, diabetes, and/or asthma