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STRESS RELATED CHANGES IN HIGH INCIDENCE OF DIABETES AND HYPERTENSION AND LOW INCIDENCE OF ASTHMA

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ABSTRACT

Background: Diabetes and hypertension are a public health burden globally, including in India. Additionally, Indian subjects are found to have higher levels of stress associated with socioeconomic status.

Aim: The present study aimed to determine the role of stress as a potential causative factor in a high incidence of diabetes and hypertension and a low incidence of asthma.

Methods: The study assessed 250 subjects who visited the health care institute in India. The subjects were assessed for the prevalence of asthma, diabetes, and hypertension along with awareness about the diseases and knowledge of the control of these conditions. The subjects were also assessed concerning their experience of stress and the type of stress they encountered.

Results: According to the study results, hypertension was reported in 46.8% (n=117) of study subjects with the highest incidence in the age range of individuals aged >40 years, and diabetes was common in 12% (n=30) of study subjects with the highest prevalence in the age range of 40-60 years. 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. The high occurrence of these morbid illnesses among Indian populations can be attributed in large part to their everyday exposure to stress.

Keywords: Astha, Diabetes, Hypertension, Stress, morbidity

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. 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. There is still much to learn about the cause of asthma. 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 of the subjects, stress is a significant aspect of everyday life that impacts the populace in many ways. 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.

Stress is mainly characterized by feelings of anger, and frustration, It may also exhibit various physical or mental 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 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 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 study was conducted at... from.. to.. with approval from the relevant Institute ethical committee. 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. All the study data was gathered by a male subject matter expert. Additionally, those that were younger than eighteen were not included.

Participants in the experiment had to be prescribed NSAIDs, have a history of asthma, and be regularly using steroids or bronchodilators. The diabetics were identified based on whether they had taken blood glucose monitoring in the past, confessed their condition to receive alternative care, or were just seeking to retake an anti-diabetic medicine. Hypertension was identified in participants if they had to disclose their condition in order to get alternative therapy, if they were taking blood pressure medicine before the consultation, or if they were often using antihypertensive medication.

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 analyse the collected data. The information was presented as frequencies and percentages. When the p-value was less than 0.05, it was deemed 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. Most of the study 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 investigation, there were no female participants and 250 men (100%) (Table 1).

The age distribution of the study subjects showed that 30.8% (n=77) were single, with 51, 23, and 3 subjects from the 18–39, 40–60, and >60 age ranges, respectively, and 69.2% (n=173) were married, with 35, 67, and 71 subjects from the 18–39, 40–60, and >60 age ranges, respectively. 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. 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. Table 3 displays the prevalence of asthma, diabetes, and hypertension among study participants aged 60 years and above, respectively: 2.70% (n = 2), 14.86% (n = 11), and 59.45% (n = 44).

In the study's participant categorization based on knowledge of illness control, 24.41% (n = 21) of the respondents in the age range of 18–39 years had uncontrolled hypertension, 2.32% (n = 2) of the subjects had uncontrolled, There were 11.62% (n = 10) and 61.62% (n = 53) individuals in the non-drug and drug-controlled states, 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). Table 4 displays the percentage of participants who were >60 years old who were ignorant, uncontrolled, non-drug, and drug-controlled, respectively: 5.40% (n = 4), 16.21% (n = 12), 66.21% (n = 49), and 12.16% (n = 9). Regarding diabetes control awareness, respondents from the 18–39, 40–60, and >60 age groups, respectively, made up 17.44% (n = 15), 12.22% (n = 11), and 4.05% (n = 3) of the sample. 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.

Non-drug-controlled diabetes mellitus was seen in 22.09% (n=19), 14.44% (n=13), and 9.45% (n=7) study subjects respectively from 18-39, 40-60, and >60 years, whereas, drug-controlled diabetes mellitus was seen in 50% (n=43), 53.3% (n=48), and 62.16% (n=46) subjects respectively from 18-39, 40-60, and >60 years of age respectively (Table 4).

Table 5 summarises the findings of the assessment of the number of comorbidities in the research subjects depending on their age distribution. 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 range. 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. 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 the study participants in this investigation 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 (100%) total. The age distribution of the study subjects showed that 30.8% (n=77) were single, with 51, 23, and 3 subjects from the 18–39,

40–60, and >60 age ranges, respectively, and 69.2% (n=173) were married, with 35, 67, and 71 subjects from the 18–39, 40–60, and >60 age ranges, respectively.

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. These results were in line with research conducted in 2021 by Persson R et al⁶ and in 2021 by Petri D et al⁷, in which the authors evaluated participants using demographic information similar to that of the current study.

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

In the 40-60 years of age range, asthma, diabetes, and hypertension were reported in 3.33% (n=3), 14.44% (n=13), and 60% (n=54) study subjects 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. Based on the categorization of research participants according to their knowledge of disease control, it was observed that, in the case of hypertension, for 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 observed in 11.62% (n = 10) and 61.62% (n = 53) of the subjects, 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). Among those over 60, the percentage of participants who were ignorant, uncontrolled, non-drug, and drug-controlled were 5.40% (n = 4), 16.21% (n = 12), 66.21% (n = 49), and 12.16% (n = 9), 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 subjects, 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 (numbers)