

Incidence of Endocrine Disorders in Indian Adult Male Population

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Abstract

Background: The comprehensive epidemiology of endocrine disorders is lacking from our country. Most of the available data pertain to the prevalence of diabetes and thyroid disorders only. We studied the incidence of endocrine disorders in a cohort of service personnel followed for a long duration. **Materials and Methods:** The data for this descriptive epidemiologic study were derived from the electronic medical records of the male service personnel enrolled between 1990 and 2015. They were recruited between the ages of 17 and 20 years in good health, and their morbidity data were derived from the medical records. We calculated the incidence rates as per person-years (py) using appropriate statistical methods. **Results:** Our analysis includes 51,217 participants (median: age 33 years, range: 17–54) with a mean follow-up of 12.5 years. Yearly evaluation of the data gave a cumulative follow-up duration of 613,925 py. The incidence of diabetes, obesity, and dyslipidemia was 0.41, 0.23, and 0.12 per 1000 py, respectively. The incidence of thyroid, parathyroid, pituitary, adrenal, and metabolic bone disorders was 3.9, 8.6, 1.6, 0.81, and 0.97 per 100,000 py, respectively. **Conclusion:** Our cohort had lower incidence rates of endocrine disorders when compared with the Western population. Long-term epidemiological studies are essential to identify the demographic trends of the endocrine disorders in India.

Keywords: Diabetes, endocrinology, incidence, India, prevalence

INTRODUCTION

Endocrinology is a young specialty among the subspecialties of the medicine and is growing at a rapid pace.^[1] The morbidity pertaining to the endocrine and metabolic disorders is on the rise due to multiple factors, including sedentary lifestyle, urbanization, and endocrine disruptors. The profile of endocrine disorders differs in developing countries like India when compared with the developed world. Vitamin D fortification led to eradication of the rickets and rise in life expectancy increased the prevalence of osteoporosis in the Western world. Symptomatic primary hyperparathyroidism, higher insulin resistance, and iodine deficiency disorders are some of the unique features of our country.^[2] A comprehensive epidemiology is essential to identify the priority areas for resource allocation in tackling the menace of the noncommunicable diseases.^[3]

A very limited number of population-based reports are available about diabetes and thyroid disorders from India.^[4-6] However, this data pertains to the disease burden as measured by the prevalence of the disease. Epidemiologists are more interested in identifying

the incidence of a disease that helps in identifying the demographic trends.^[7] The difference between the incidence and prevalence is important in lifestyle disorders with prolonged asymptomatic phase. Data from Chennai exist about the incidence of diabetes from our country.^[8] Similar studies about the epidemiology of diabetes exist from the USA, about the military recruits exposed to stressful situations.^[9] However, population-based studies that evaluate the risk of endocrine disorders are not available from our country. Hence, we conducted this study to assess the incidence of the endocrine disorders in an adult male population.

MATERIALS AND METHODS

Study procedure

We conducted this retrospective analysis of the electronic medical records (EMRs) pertaining to all the service personnel

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belonging to our organization. Our organization provides health-care services to the armed forces and their dependent family members. We are approximately 55,000 health-care personnel (HCP), working at various primary, secondary, and tertiary level health-care centers. The sickness and hospitalization record of all the HCPs are captured in the database. The individuals suffering with disabilities that require long-term observation are placed in low medical category and are reviewed periodically. The disorders are entered as per the International Classification of Diseases (ICD) classification in the service record that helps in the follow-up. Currently, the organization rules do not allow induction of females in personnel below officer rank, thereby limiting our data to males only. The study population is out-migrated from the database only on retirement from the service. The data do not include the deceased population and the morbidity of the doctors and nurses as these are maintained by a different office.

Study population

The participants of this study were enrolled in the active military service from the year 1990 onward. The personal medical records of all the individuals have been entered into the electronic database maintained from the year 1990 onward. Each year, the number of enrollees varies based on the requirement and vacancy. We have data pertaining to the 51,217 participants who were recruited over the past 25 years till December 2015. The EMR provided the data on occupational and demographic particulars that include age, educational level, marital status, deployment in the combat zone, medical diagnosis, and age at the time of the diagnosis. The study population is derived from all regions of our country and is skewed more toward the lower socioeconomic strata with a rural background.

Case definition

The diagnosis was identified from the EMR using the ICD codes and not by perusing the individual medical records. The case details were linked to all the relevant demographic details using the unique patient number across the entire database. The patients were managed across the health centers located in our country, and the EMR database of the HCP is updated every day. We divided the endocrine morbidity into seven categories that include diabetes, obesity, dyslipidemia, thyroid, adrenal, pituitary, and bone disorders. The American Diabetes Association, Adult Treatment Panel-III, and WHO guidelines were used to define diabetes, dyslipidemia, and obesity, respectively.^[10]

Statistical analysis

We calculated the incidence rate as the number of new cases diagnosed per year divided by the total number of person-years (py) follow-up. We have calculated the incidence per year based on the number of the new cases per year divided by the number of enrollees for the same year. In view of the small numbers, we did not give this data separately in our results. The index year was noted based on the first entry of the medical condition in the service record of the individual.

We did not calculate the prevalence of the disease as certain endocrine disorders received definitive therapy resulting in cure of the disease. We did not calculate the incidence rate as per the age-wise groups for the small patients in the group.

RESULTS

The study participants consist of 51,217 males followed up for a mean duration of 12.5 years. Our data gave an exact follow-up duration of 613,925 py. Type 2 diabetes ($n = 251$) is the most common disability followed by obesity ($n = 141$), dyslipidemia ($n = 75$), thyroid ($n = 24$), and parathyroid ($n = 53$) disorders. Other endocrine disorders recorded in our EMR include Type 1 diabetes ($n = 15$), osteoporosis ($n = 3$), Conn's syndrome ($n = 3$), Cushing's disease ($n = 6$), acromegaly ($n = 3$), fibrous dysplasia ($n = 3$), central diabetes insipidus ($n = 1$), and pseudohypoparathyroidism ($n = 1$). None of our participants had a diagnosis of pheochromocytoma. The incidence of diabetes, obesity, and dyslipidemia was 0.41, 0.23, and 0.12 per 1000 py, respectively. The incidence of thyroid, parathyroid, pituitary, adrenal, and metabolic bone disorders was 3.9, 8.6, 1.6, 0.81, and 0.97 per 100,000 py, respectively.

DISCUSSION

Our study gives a glimpse of the endocrine morbidity pertaining to a large number of young Indian males. A previous report from Chennai and a report on the military recruits from the USA showed a higher incidence rate of diabetes when compared with our data.^[8,9] This could be due to the ethnic differences, lifestyle of the service personnel, and also the difference in the median age of the participants. The higher incidence of the obesity and dyslipidemia could be explained by the change in the lifestyle of the service personnel and being part of the societal trends.^[11,12] However, the individual contribution of the obesity in each case of diabetes and vice versa was not evaluated in our study. Another interesting point of our survey includes that the population were relatively young at the time of entry into the service and are exposed to various occupational stress and strain that increased the risk of various endocrine disorders. The majority of these individuals hails from the rural areas and lower socioeconomic status, which could affect the data.^[13]

The data pertaining to the incidence of the endocrine disorders are not available widely. A comprehensive report from the USA showed the available literature enabling us to compare the same with our data as shown in Table 1.^[14] The observed differences could be due to the ethnic differences coupled with lack of foolproof EMR system. The low prevalence of the thyroid disorders is a surprising observation of our database when compared with the published data.^[15] This could be explained by the self-medication of the participants or getting medical care beyond our organizational resources. There are no distinct demarcating features that identify the thyroid disorders and hence these patients could have been missed to be included in

Table 1: Comparison of incidence rates between our study and the USA data

Diagnosis	n	Our study	USA data, Golden <i>et al.</i> ^[14]	Remarks
Type 2 diabetes	251	0.41	6.6	per 1000 py
Obesity	141	0.23	Not available	per 1000 py
Dyslipidemia	75	0.12	Not available	per 1000 py
Acromegaly	3	0.49	Not available	per 1 lac py
Cushing's disease	6	0.98	Not available	per 1 lac py
Hypothyroidism	8	1.32	Not available	per 1 lac py
Hyperthyroidism	12	1.95	Not available	per 1 lac py
Thyroid nodule	4	0.65	21.1	per 1 lac py
Hypoparathyroidism	16	2.61	Not available	per 1 lac py
Primary hyperparathyroidism	37	6.03	13.8	per 1 lac py
Osteoporosis	3	0.49	Not available	per 1 lac py
Conn's syndrome	3	0.49	Not available	per 1 lac py
Pseudohypoparathyroidism	1	0.16	Not available	per 1 lac py
Central diabetes insipidus	1	0.16	Not available	per 1 lac py
Monostotic fibrous dysplasia	3	0.49	Not available	per 1 lac py
Type 1 DM	15	2.44	13-26*	per 1 lac py

*Varies as per the age group between 1 and 19 years of age. DM: Diabetes mellitus, py: Person-years

the EMR. The low incidence of Type 1 diabetes could be due to the differences in the median age of our cohort.^[16]

The strength of our study includes the seminal nature of the report from India and also a long follow-up duration of a sizeable number of individuals. However, our study also has certain limitations. First, the data do not include the patients who have been treated outside the organization. Second, we did not peruse the original medical records of the participants to confirm the ICD diagnosis. The possibility of a clerical or data entry error exists in the data which could affect the incidence data. Third, our database does not give any information about the pediatric endocrine disorders.

CONCLUSION

We described the incidence rates of endocrine disorders from a larger population. Similar data from a captive cohort with robust follow-up are essential to further support our observations. The practice pattern in India makes it difficult to generate the incidence data, and the government should promote the research at the community level to fill the gaps in the existing knowledge.

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Conflicts of interest

There are no conflicts of interest.

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