



A Prospective Study of Seasonal Variation in the Number of infectious Cases Diagnosed at a Tertiary Care Hospital, Gujarat, India

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ABSTRACT

Most of the developing countries still suffer from a high burden of communicable diseases as the disease patterns change constantly due to seasonal variation. The mechanisms responsible for the epidemiological consequences of this seasonal variation are poorly understood. Analysis of proper data of communicable diseases is required to determine the current burden as well as seasonality. The objectives of this study are to assess the disease trend and seasonality of infectious disease. A retrospective analysis of inpatient hospital database of 2 years (October 2018 - September 2020) was done to identify the pattern and trend of different IDs including seasonal variations. Results showed that a total of 3647 had been treated at the inpatient departments from the year October 2018 to September 2020. It was observed that communicable diseases constituted about 48.3% of the total disease burden with respiratory tract infection being the commonest. Most of the diseases were observed to have a seasonal variation. The most common disease identified was respiratory tract infections, secondly UTIs in communicable diseases and Bronchitis followed Gastroenteritis in non-communicable diseases. The least common were Hepatitis. Many diseases have a seasonal variation and the burden of these diseases could be reduced if we device measures to detect the changes in their trend through the implementation of surveillance programs. The knowledge of the burden of these would also assist the health administrators in allocation of the resources.

Keywords: *Communicable diseases, Seasonal variation, Disease outbreaks, Infectious diseases*

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INTRODUCTION

Despite of economic growth and development, most countries still have a high burden of infectious diseases that raises some urgent concerns. The main reason for this is lack of proper data regarding the current burden and seasonality of various communicable diseases [1-3]. Such human health impacts are most likely to occur where extreme weather and a vulnerable population combine together [2]. The "Global Burden of Disease Project" suggests that about 30% of disease burden in India is attributable to infections [3]. Many countries in the world have taken steps for the strengthening of the surveillance system for the communicable as well as non-communicable diseases which are slowly and steadily spreading their tentacles from the developed to the developing countries. The issue was bolstered by the World Health Assembly in the year 1995, when it advocated the strengthening of the surveillance of the diseases for the early detection of the emerging or the reemerging infections [4].

The aim and objectives of this study were to study the overall incidence of infectious diseases, to find out the seasonal variation of these diseases and to suggest preventive and curative measures.

MATERIAL AND METHODS

This prospective cross sectional study was conducted at medicine ward with 3 hospitals to assess seasonal variation of infectious disease. Inpatient prescription data were collected by random sampling techniques from October 2018 – September 2020. A total of 3674 patients' data were collected and evaluated as per Communicable and Non communicable disease infectious disease. Information were obtained including patient sex, age and diagnosis, and the prescribed items related information such as medicines and the dosage forms. The prescriptions collected belonged to Medicine department. With an ensuing epidemiological transition, the importance of the non-communicable diseases in the developing world

cannot be overlooked. We have therefore extracted the data of non-communicable diseases from that of the other diseases and injuries in order to see their seasonal variation and separate significance.

Exclusion criteria

We have excluded the cases of the obstetrical complications from the analysis and have thus not presented them in the results because their number was negligible.

Statistical analysis

The data were entered and analyzed using the Microsoft Excel and statistical analysis was done. The total number of the patients suffering from the different diseases and their percentages in the different months and according to the gender was calculated.

RESULTS

The present study found that a total of 3647 patients were admitted at internal medicine ward during study period. Among these, 1765 cases were diagnosed as communicable diseases. It was observed that respiratory tract infections were the most commonly diagnosed diseases followed by Urinary tract infection in communicable disease (table 1). Second only to the group of non-communicable infectious disease, Bronchitis were found to be the major contributors to the morbidity followed by Gastroenteritis, Ulcerative colitis, Abdominal infection.[Table 2]. Viral fever contributed to a major proportion of the communicable diseases.

Overall, there were 54.1% of males and 45.9% of females diagnosed with communicable disease among admitted patients at Internal medicine wards. [Table 1]There was a slight female (54.5%) preponderance in admitted cases of non-communicable disease. However, male patients (45.5%) outnumbered females in admission with non-communicable disease. [Table 2]While there was respiratory tract infection found more in male patients. Similar number of cases for both genders admitted with Influenza, Hepatitis in communicable disease. [Table 1]COPD and Intestinal Obstruction were found with similar number of cases in male and female in non-communicable disease. [Table 2]

The plot for the seasonal variation of the infectious diseases revealed an increase in the number of cases suffering from GI disorder in the months of March. A similar upsurge of the Respiratory diseases was observed in the July [Figure 1]. The seasonal distribution of the other infectious diseases revealed that almost all the diseases had a seasonal variation with the peaks occurring in the months of March and July. The variation was more evident in the Respiratory disorder and GI disorder.

Table 1. Distribution of Communicable disease

| Diagnosis | Male | Female | Grand Total |
|-------------------|------------|------------|-------------|
| LRTI | 322(18.2%) | 266(15.1%) | 588(33.3%) |
| UTI | 298(16.9%) | 203(11.5%) | 501(28.4%) |
| URTI | 144(8.2%) | 122(6.9%) | 266(15.1%) |
| VIRAL FEVER | 51(2.9%) | 94(5.3%) | 145(8.2%) |
| H.PYLORIINFECTION | 66(3.7%) | 42(2.4%) | 108(6.1%) |
| INFLUENZA | 39(2.2%) | 39(2.2%) | 78(4.4%) |
| TB | 17(1%) | 27(1.5%) | 44(2.5%) |
| PULMONARY KOCH | 11(0.6%) | 14(0.8%) | 25(1.4%) |
| HEPATITIS | 6(0.3%) | 4(0.2%) | 10(0.6%) |
| Total | 954(54.1%) | 811(45.9%) | 1765 |

Table 2 Distribution of Non communicable disease

| DIAGNOSIS | Male | Female | Grand Total |
|-------------------------|------------|-------------|-------------|
| Bronchitis | 228(12.1%) | 333(17.7%) | 561(29.8%) |
| GASTROENTERITIS | 292(15.5%) | 243(12.9%) | 535(28.4%) |
| Ulcerative COLITIS | 58(3.1%) | 75(4%) | 133(7.1%) |
| ABDOMINAL INFECTION | 47(2.5%) | 68(3.6%) | 115(6.1%) |
| INTRA ABDOMINAL ABSCESS | 43(2.3%) | 63(3.3%) | 106(5.6%) |
| COPD | 40(2.1%) | 55(2.9%) | 95(5%) |
| CHRON'S DISEASE | 34(1.8%) | 60(3.2%) | 94(5%) |
| INTESTINAL OBSTRUCTION | 39(2.1%) | 52(2.8%) | 91(4.8%) |
| ACUTE ENTERIC FEVER | 32(1.7%) | 44(2.3%) | 76(4%) |
| ACUTE KIDNEY INFECTION | 31(1.6%) | 25(1.3%) | 56(3%) |
| ACUTE PANCREATITIS | 12(0.6%) | 8(0.4%) | 20(1.1%) |
| Total | 856(45.5%) | 1026(54.5%) | 1882 |

An attempt to study the seasonal variation of the Communicable and non-communicable diseases revealed a strange seasonal variation with an increase in the number of cases occurring in the months of March [Figure 2]. Urinary tract infection was more common in the months of March, while Immune disorder had peaks in the months of April

Figure 1. Month wise distribution of infectious diseases

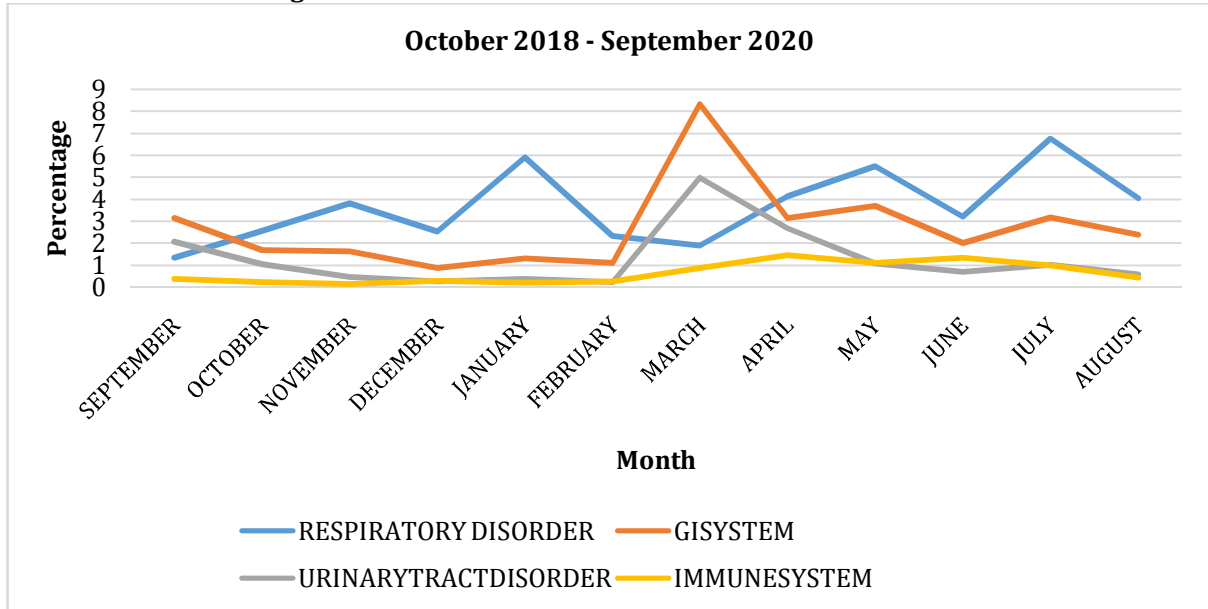
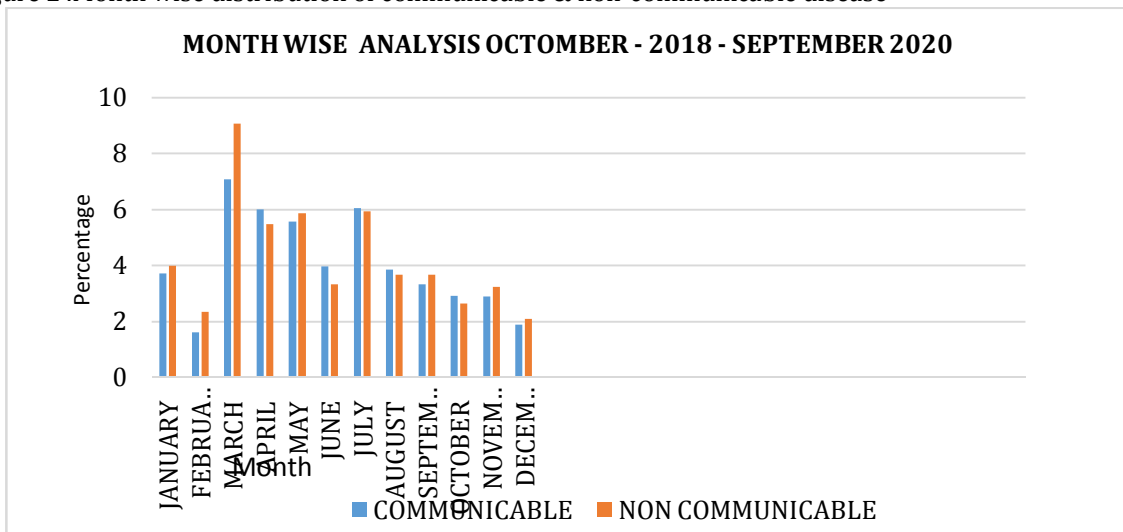


Figure 2 .Month wise distribution of communicable & non-communicable disease



DISCUSSION

Communicable and Non-Communicable diseases accounted almost similar morbidity, which is the general pattern observed in our study. Among the communicable diseases, respiratory tract infection contributed maximum, and this finding is similar to the finding observed by various studies done in India [1, 5, 6] The findings of the present study regarding gender distribution of admitted patients (49.6% male, 50.3% female) align with earlier studies done by Rammohan Roy *et al* [3]. (34% male, 66% female). The results of the present study indicate that Respiratory tract infections and GI disorder were the most commonly diagnosed diseases. Studies conducted in Pakistan, have found a similar pattern of diseases, with the most common illnesses being Respiratory tract disorder [9,10]. Our results differed from those of Ranjeeta Kumari *et al*, who in their study conducted at OPD in Kanpur, India found that communicable diseases constituted about half of the total burden of the diseases with skin infections being the commonest; the non-communicable diseases constituted about one-fifth of the total disease burden [5]. Also, Kalyani *et al*. found that communicable diseases constituted about 85% of the total disease burden with viral infections being the commonest. Most of the diseases were observed to have a seasonal

variation. The most common disease identified was viral fever (28.96%), secondly acute diarrheal diseases(26.52%) followed by enteric fever (9.83%) and malaria(8.12%) [1].The results similar with a study conducted in the teaching hospital at central kerala where respiratory tract infection was the most common infection [6, 7].

Morbidities due to clustering of communicable diseases are known to follow a seasonal trend. On analysis for seasonal variation ARI showed increase during June -July (rainy season), which is the pattern shown in our study. However, the pattern of increase in ARI observed in the study conducted by Naveen K Goel *et al.* was during winter [8, 11].

Seasonal distribution of morbidities shows that maximum morbidities were observed in Mach(early summer) followed by July (Rainy season) and then January (winters) in our study and different findings were seen in the study done by Kansal S et al at Uttar Pradesh where most of the morbidities registered were found in rainy season followed by the winter season.¹²Kumari R et al in study at Kanpur also found maximum burden of diseases in the monsoon months than summer and winter months[5].

The variations in the frequency of the occurrence of the various diseases could be attributed to the differences in the environmental and the host factors in the different geographic areas. If the frequency of a certain disease varies in areas with similar environmental conditions, it coerces us to think about the lacunae in either the delivery of health care to the people or an investigation for the search of the host factors leading to the differences.

LIMITATIONS

The inherent limitation of the study is that the use of secondary data analysis may compromise the data quality because the researchers did not know exactly the process of primary data collection. Another limitation is that the findings of the current study may not reveal the actual picture of the entire infectious diseases burden of this hospital because the patient of skin infection, HIV/AIDS, pneumonia and tuberculosis were generally admitted in the specialized ward.

CONCLUSION

Observations of the present study about pattern, trend, and seasonality of communicable and non-communicable diseases may provide valuable information to detect the structural and organizational changes needed for more efficient management of infectious diseases including new emerging health problems.

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ETHICAL CLEARANCE

Ethical approval has been taken from ethics Committee of K.B institute of pharmaceutical education and research Gandhinagar.

CONFLICTS OF INTEREST

No.

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