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Original Research Article

Morbidity pattern of communicable diseases in a tertiary care hospital in metropolitan city of western Maharashtra

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ABSTRACT

Background: In India, infectious diseases continue to be predominant with emerging non-communicable diseases, imposing a double burden of diseases on health care system. Hence, the tertiary health care hospital-based study was done to compare the morbidity pattern of communicable diseases with respect to non-communicable diseases.
Methods: A 2 years' record-based data of admitted patients was collected in a tertiary health care hospital. The data was analysed using Microsoft Excel version 365. Significance of association and difference in proportions has been checked with chi-square test and Z test for SEDP respectively at significance level of 0.05.
Results: During the study period of two years, 6818 patients were admitted in the hospital, of which 74.51% suffered from communicable diseases while 25.49% suffered from other types of disease including non-communicable diseases. Of the 5080, patients with communicable diseases, 57.74% were males and 42.26% were females. Communicable diseases and non-communicable diseases had male predominance ($p<0.05$) and was higher amongst age group 0-15 years ($p<0.05$). Hospital stay was prolonged in patients suffering from communicable disease ($p<0.05$). Significant increased difference was found in AFI, Malaria, Dengue and in Leptospirosis prevalence and significant decreased difference was found in acute gastroenteritis, IV, Covid-19, Respiratory infections and enteric fever ($p<0.05$).
Conclusions: Communicable diseases continue to be a major threat to public health system in India. Through effective surveillance programmes, any change in trends of disease can be identified and suitable measures can be adapted to control and prevent it.

Keywords: Communicable diseases, Non-communicable diseases, Seasonal trend, Prolonged hospital stay

INTRODUCTION

Transitions in the demographic and epidemiological landscape present a considerable challenge to public health, particularly in low- and middle-income nations.[1] India is a varied country in terms of geography, social structures, religious beliefs, and economic systems despite its genetic similarity. As a result, the incidence of infectious and non-communicable illnesses continues to vary greatly throughout the country's many geographic areas.[2] Infectious diseases continues to be predominant with emerging non-communicable diseases, thereby imposing a double burden of diseases on health care system of the country.[3] The improvement of health infrastructure, innovative health policies, and preventative measures helped people to achieve better control over the incidence and outbreaks of many communicable illnesses.[3,4]

In 2016, three of the top five causes were non-communicable diseases (NCDs) like ischemic heart disease, chronic obstructive pulmonary diseases,

cerebrovascular disease, while communicable diseases (diarrhoea and lower respiratory infections) were responsible for the remaining two.[5] As an inference, many of the authors suggest that health systems should prioritize NCDs for allocating resources.

According to the Lancet Global Burden of Disease Study, it is found that non-communicable diseases (NCDs) accounted for 61.8% of all mortalities, whereas communicable diseases accounted for 27.5% of all deaths in 2016.[6] India launched the National Surveillance Program for Communicable Diseases during 1997-1998 with the objective of early detection and timely response to outbreaks of communicable diseases.[7] It is said that early identification and detection of infectious diseases in a region is necessary for appropriate measures of control and prevention.[8]

Prolonged hospitalizations defined as hospital stay of more than 21 days or 3 weeks, have been linked to clinical and socioeconomic characteristics, as well as indicators of increasing severity, such as palliative care consultation, surgery, and ICU admission. Due to prolonged hospital stay there is decrease in bed vacancy and pose threat to healthcare facilities.[9]

Thus, this study was conducted with an objective to assess the morbidity pattern and trend of communicable diseases with respect to non-communicable diseases in the tertiary care hospital, Thane.

METHODS

A record-based study was conducted in tertiary care hospital, Thane, after obtaining permission from concerned authorities. Complete enumeration of data of all patients discharged from various departments in this hospital from 1st March 2020 to 28th February 2022 (24 months) was collected from Medical Record Department of hospital. Cases with incomplete records were excluded. Data was entered in Microsoft Excel. Variables considered are age, gender, ward, hospital stay and diagnosis types of communicable diseases. Related frequency and percentage were drawn for independent variable and trend analysis was carried out to understand the trends of the diseases. Association between dependent and independent variables with help of chi square test was carried out and significance level was established at $p<0.05$. Also, year wise difference in proportion of occurrence of diseases was checked with Z test with SEDP at 5% level of significance.

RESULTS

Out of total 6818 patients of all age and gender admitted to the hospital from 1 March 2020 to 28 February 2022, 5080 (74.51%) were admitted in wards for communicable diseases, while 1738 (25.49%) were of other types of disease including non-communicable diseases. Out of total of all the admissions of 6818 patients, 4125 (60.50%) were male and 2693 (39.50%) were female. From 5080 patients with communicable diseases, 2933(57.74%) were males and 2147 (42.26%) were females. On the other hand, out of 1738 suffering from other types of disease including non-communicable diseases, 1192 (68.58%) were male and 546 (31.42%) were female (Table1). Mean age of all admitted patient was 34.69±39.76 years and median age was 33 years. Mean age for patients admitted for communicable diseases was 31.45±21.49 years and for non-communicable diseases was 27.50±20.41 years. Almost 52.26%patients were of age below 30 years from both communicable and non-communicable disease. In every age-group, proportion of communicable disease patients is higher than that of non-communicable disease patients. Furthermore, the most incidences of communicable diseases25% were reported in patients aged 0 to 15 years and 11% were seen in senior citizens group (Table 1).

Table 1: Age and gender wise distribution of patients.

Age (years)	Communicable diseases			Non communicable diseases			Total (%)
	Male (%)	Female (%)	Total (%)	Male (%)	Female (%)	Total (%)	
0-15	686 (23.38)	588 (27.39)	1274 (25.07)	422 (35.40)	200 (36.63)	622 (35.79)	1896 (27.81)
16-30	683 (23.29)	566 (26.36)	1249 (24.58)	307 (25.76)	111 (20.33)	418 (24.05)	1667 (24.45)
31-45	655 (22.33)	418 (19.47)	1073 (21.12)	233 (19.55)	113 (20.70)	346 (19.91)	1419 (20.81)
46-60	593 (22.22)	331 (15.42)	924 (18.19)	134 (11.24)	69 (12.64)	203 (11.68)	1127 (16.53)
>60	316 (10.77)	244 (11.36)	560 (11.02)	96 (8.05)	53 (9.71)	149 (8.57)	709 (10.40)
Total	2933 (57.74)	2147 (42.26)	5080 (74.51)	1192 (68.58)	546 (31.42)	1738 (25.49)	6818 (100)

Table 2: Admission and year wise distribution of patients

Year	Admission of patients		
	Communicable disease cases (%)	Non communicable and other type of disease cases (%)	Total (%)
2020-2021	2478 (79.96)	621 (20.04)	3099 (45.45)
2021-2022	2602 (69.97)	1117 (30.03)	3719 (54.54)

65.26% cases from communicable disease and 46.38% cases from non-communicable diseases were found to be admitted in medicine ward followed by 22.11% and 16.17% cases in paediatrics for both type of diseases. Proportion of communicable disease patients were found more in every ward of admitted patients except surgery ward (Figure 1).

In comparison of two consecutive years, out of all cases, admission flow of cases was higher in 21-22 (54.54%) in comparison of preceding year 20-21 (45.45%) which show 9% rise in admission of hospital. Also, 10% declination has been observed in admissions of communicable disease patients from year 20-21 to 21-22 (80% to 70%) while, 10% increase has been noted in admission of non-communicable and other type of diseases in patients from year 20-21 to 21-22 (Table 2).

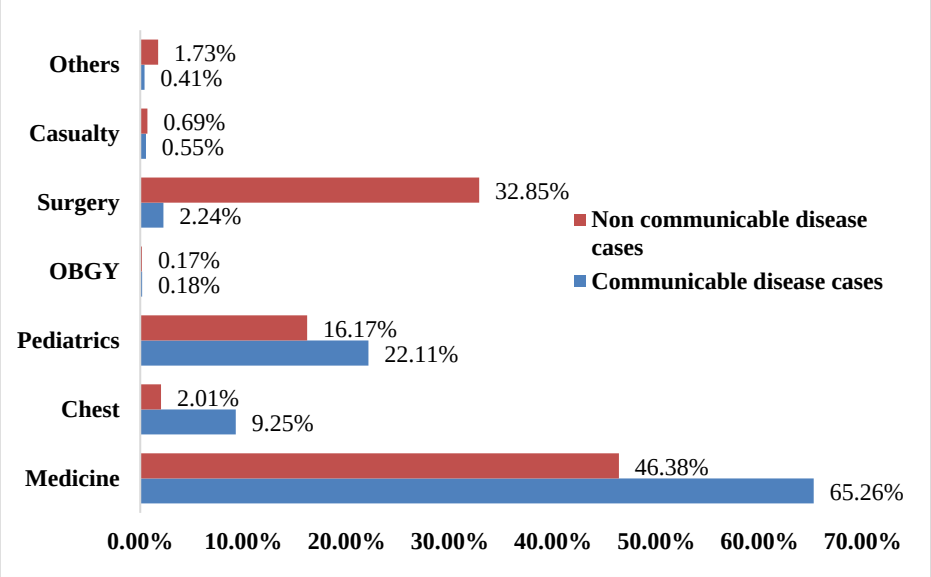

Figure 1: Disease wise admission of patients.

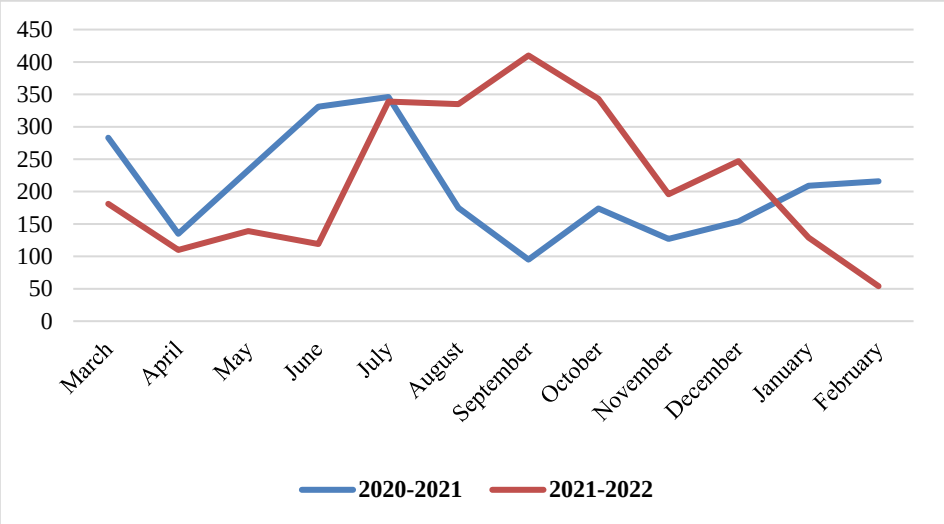

Figure 2: Seasonal trend of communicable diseases over 2 years.

Seasonal trend analysis illustrates in year 2020-2021, highest cases 346 (13.96%) were observed in July while minimum cases 95 (3.83%) was noted in September in contrast to the year 2021-2022, where maximum cases admitted in September as 410 (15.76%) and minimum, 54 (2.08%) noted in February (Figure 2).

Out of 5080 communicable disease cases, maximum patients were suffering from respiratory infections 1003 (19.74%) followed by 870 (17.13%) acute gastroenteritis cases and 857 (16.87%) cases of acute febrile illnesses. COVID 19 cases had peak in 2020-2021 followed by dip in 2021-2022. Respiratory infections, acute gastroenteritis, enteric fever, meningitis, acute flaccid paralysis, HIV, tuberculosis, viral hepatitis and leprosy followed similar trend of declination from 2020-2021 to 2021-2022. Compared to 2020-2021, there was increase in acute febrile illness, urinary tract infections, syphilis

and arthropod borne diseases such as malaria, dengue and leptospirosis in 2021-2022 (Table 3). Differences in proportion of occurrence of communicable disease in two consecutive years are checked with Z test with SEDP at level of significance of 0.05. Significant increased difference was found in AFI, malaria, dengue and in leptospirosis prevalence ($p<0.05$). Significant decreased difference was found in Acute gastroenteritis, IV, COVID-19, respiratory infections and enteric fever ($p<0.05$) (Table 3).

The average hospital stays for all admitted patients was 5.28 days. The average hospital stay for patients was 5.92 days for suffering from communicable diseases and 3.51 days for that of non-communicable diseases. Almost 96.81% communicable cases have treated in hospital within 3 days and hence 3.19% had prolonged hospital stay. Also, 98.21% admitted for non-communicable diseases up to3 days and 1.79% had prolonged hospital stay. Communicable diseases and non-communicable diseases had male predominance which was very highly significant with p value <0.00001. Disease occurrence was higher amongst age group 0-15 years which was very highly significant with p value =0.000. (Table 4).

Table 3: Disease wise distribution of communicable cases over 2 years.

Disease/year	2020-2021 (%)	2021-2022 (%)	Trend	Significance
Acute febrile illness	78 (3.15)	779 (29.94)	Increase	p<0.00001*
Malaria	142 (5.73)	231 (8.88)	Increase	p<0.00001*
Dengue	38 (1.53)	261 (10.03)	Increase	p<0.00001*
Leptospirosis	5 (0.20)	16 (0.62)	Increase	p=0.02202*
Acute gastroenteritis	513 (20.70)	357 (13.72)	Decrease	p<0.00001*
COVID 19	562 (22.68)	42 (1.61)	Decrease	p<0.00001*
Respiratory infections	580 (23.41)	423 (16.26)	Decrease	p<0.00001*
Enteric fever	60 (2.42)	39 (1.50)	Decrease	p=0.01732*
HIV	73 (2.95)	19 (0.73)	Decrease	p<0.00001*
Urinary tract infections	4 (0.16)	8 (0.31)	Increase	p=0.28462
Syphilis	0 (0)	3 (0.12)	Increase	p=0.09102
Others	11 (0.44)	23 (0.88)	Increase	p=0.05486
Meningitis	22 (0.89)	19 (0.73)	Decrease	p=0.5287
Acute flaccid paralysis	3 (0.12)	1 (0.04)	Decrease	p=0.29372
Tuberculosis	341 (13.76)	340 (13.07)	Decrease	p=0.4654
HIV+Tuberculosis	3 (0.12)	2 (0.08)	Decrease	p=0.61708
Viral hepatitis	40 (1.61)	37 (1.42)	Decrease	p=0.57548
Leprosy	3 (0.12)	2 (0.08)	Decrease	p=0.61708
Total	2478 (48.78)	2602 (51.22)	Increase	

Table 4: Association between disease pattern of cases and socio-demographic variables.

		Communicable diseases	Chi Square	P value
Gender	Male	2933 (57.74)	63.7732	<0.00001*
	Female	2147 (42.26)		
Age (years)	0-15	1274 (25.08)	95.146	0.000*
	16-30	1249 (24.59)		
	31-45	1073 (21.12)		
	45-60	924 (18.19)		
	>60	560 (11.02)		
Hospital stay (weeks)	<3	4918 (96.81)	9.2977	<0.002294*
	>3	162 (3.19)		

DISCUSSION

In our study there was male preponderance in admitted patients with higher predominance in communicable and non-communicable diseases which was statistically significant ($p<0.05$). In contrast to our study, Dhoble et al study in Maharashtra and Datta et al study in Tripura showed female predominance while Kalyani et al study in Hyderabad showed no gender bias.[10-12] Thane district being an industrial area, there are many people who come to Thane for a good job. As a result, more males get admitted.

In our study, 52.26% cases belong to age groups <30 years similar to Dhoble et al study in Maharashtra where diseases were prevalent in 15-30 years.[10]

Also 49.65% communicable disease cases have been seen upto age 30, similarly Datta et al study in Tripura, where communicable cases were highest amongst 11-20 age group.[11] Unlike our study, in D Kalyani et al study conducted in Hyderabad, communicable cases were prevalent in 19-59 age groups.[12]

In our study, maximum cases were admitted in medicine ward, i.e., 4121 (60.44%) followed by 1404 (20.59%) cases in paediatrics and 685 (10.05%) in surgery and minimum cases 12 (0.18%) in OBGY department. This could be because of COVID-19 surge in India and thereby increase in admission to medicine wards.

Our study shows that out of 5080 communicable disease cases, maximum patients were suffering from respiratory infections 1003 (19.74%) followed by 870 (17.13%) acute gastroenteritis cases and 857 (16.87%) cases of acute febrile illnesses. Due to COVID 19 pandemic and strict lockdown, there was decrease in arthropod borne diseases and increase in respiratory infections. Increase respiratory infections could be because of COVID pandemic effect. During COVID-19, there could be underreporting and reduced laboratory testing for other communicable diseases. Post removal of lockdown restrictions, there is further increase in arthropod borne diseases. As per Kalyani et al study, most common communicable disease was viral fever with 28.96% followed by acute diarrheal diseases with 26.52% similar to our findings.[12] In the Datta et al study in Tripura, the commonest cause was acute respiratory infections (31.10%) similar to our findings. In Dhoble et al study in Maharashtra, 34.54% patients were suffering from bacterial infections followed by 30.03% acute gastroenteritis which is higher than our study.[10]

Seasonal trend analysis in our study shows reduction in number of communicable cases in months of August to December in year 2020, this could be due to strict lockdown due to COVID 19 Pandemic. In our study, peak of communicable cases in monsoon season (July to September) and dip in winter season (October to February) was observed. Similar findings were seen in Dhoble et al study in Maharashtra and Kumari et al study in Kanpur.[10,13] Usually trends of admissions increase in monsoon and post monsoon season. But it was seen that it was decreased in 2020. This could be attributed to lockdown resulting in decrease transmission as well as decrease health seeking behaviour.

Hospital stay was prolonged in communicable disease cases compared to non-communicable diseases ($p<0.05$). This could be because of longer communicability period in infectious disease and thus prolonging duration of hospital stay.

Limitations

The results of this study are based on the secondary data available from the department of medical record of hospital. Hence some data need to exclude because of non-availability.

CONCLUSION

Communicable diseases continue to be a major threat to public health system in India. Airborne diseases were reported to be most common type of communicable diseases. Communicable diseases cause prolonged hospital stay causing reduced bed vacancy and thus measures to reduce communicable diseases through preventive and curative measures should be emphasised. Through effective surveillance programmes, any change in trends of disease can be identified and suitable measures can be adapted to control and prevent it. Although, admissions for various conditions does not necessarily reflect the disease prevalence.

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