SURVEILLANCE OF COMMUNICABLE DISEASES IN TERTIARY HEALTH CARE SYSTEM IN CHANDIGARH, UT

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ABSTRACT

BACKGROUND: Communicable disease surveillance is to have baseline data which will be helpful for planning and also for identifying epidemics under non-evident conditions. OBJECTIVE: To delineate the pattern of occurrence of communicable diseases so as to enable early identification, followed by appropriate and timely response to outbreaks. MATERIALS AND METHODS: Reports of listed communicable diseases from various departments and centers of Government Medical College, Chandigarh, involved in clinical care and laboratory diagnosis, were collected by the Department of Community Medicine on a weekly basis. Analysis of surveillance data was done for a period of 1 year - including reports from March 2005 to February 2006. STATISTICAL ANALYSIS: Percentage, normal test of proportions, time series analysis. RESULTS: Out of 19,378 cases of various communicable diseases, 11,575, i.e., more than half, were dealt with by health centers. Thus maximum cases of acute respiratory infections (ARIs) [8,278 (71.87%)] and acute diarrheal diseases (ADDs) [3,148 (54.4%)] were dealt with by health centers. Of 19,378 cases, 11,518 (59.44%) were of ARIs, 5,786 (29.86%) of ADDs and 550 (2.84%) of pulmonary tuberculosis. There was no significant difference in the incidence of either disease between two sexes. Most, i.e., 4,413 (38.31%), cases of ARIs and 512 (86.49%) cases of pneumonia were reported in winter; ADDs - 2,607 (45.05%) in summer; and typhoid - 94 (41.04%) in the monsoon season. CONCLUSION: Maximum workload of common communicable diseases was borne by health centers. The most common morbidity was ARIs, followed by ADDs and pulmonary tuberculosis. No significant gender predilection was seen. Overall reporting of communicable diseases observed in three different seasons was found to show a gradual increase from winter to summer through monsoon. Some specific seasonal trends were demonstrated by various morbidities.

Key words: Communicable diseases, health centers, morbidity, seasonal trend, surveillance

Communicable disease is an illness due to a specific infectious agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal or from the environment (through air, dust, soil, water, food, etc). to man or animal.[1] In essence, infectious diseases are transmitted from the reservoir/ source of infection to susceptible host. Frequent occurrence of these diseases in the form of outbreaks in the past and the need to control them resulted in the development of a separate discipline named 'epidemiology.' There is a renaissance in the study of communicable diseases stimulated by (a) changes in the pattern of communicable diseases (b) the discovery of new infections and (c) the possibility that some chronic diseases may have an infective origin. The development of vaccines and antibiotics was not followed, as predicted, by the virtual disappearance of infectious diseases. Their prevention and control requires, in addition to other factors , the knowledge of when, where, at what time and how much of population is burdened by these.

An insight into the epidemiological pattern of occurrence of communicable diseases in a region or a health care setting, in particular, provides a strategic tool in the hands of physicians to diagnose and treat them effectively and timely. It also enables the health system planners and administrators to formulate and implement efficient policies to decrease the prevalence of such diseases or maintain them at a level where they do not become a significant public health problem. In fact, by the year 1995 the issue had become politically so important that the World Health Assembly urged all its 191 member countries to strengthen the surveillance of infectious diseases in order to detect re-emerging infections promptly, identify emerging infections and to respond more appropriately to both epidemic and endemic infectious diseases.[2]

Having recognized the crucial importance of disease surveillance for improving the health of people, the Government of India launched National Surveillance Programme for Communicable Diseases (NSPCD) during 1997-98 with the main objective of capacity building at the state and district level for early identification, followed by appropriate and timely response to outbreaks of communicable diseases.[3] Integrated Disease Surveillance Project (IDSP) by virtue of inclusion of noncommunicable diseases will be of added importance in health planning since it also emphasizes identification of risk factors. Routine data reported under IDSP require separation of seasonal and long-term fluctuations for the purpose of proper planning and management; otherwise, reported figures may mislead the planners in understanding the disease pattern. Reported figures are net effects of various effects, and health planners may be interested in long-term as well as short-term planning. This article delineates the burden and pattern of communicable diseases as reported in Government Medical College Hospital, Chandigarh, adjusting seasonal effects.

MATERIALS AND METHODS

Under the National Surveillance Programme for Communicable Diseases (NSPCD), Department of Community Medicine has been established as a sub-nodal center for surveillance in Government Medical College (GMC), Chandigarh, with the head of the department as the overall coordinator. The disease reports were provided weekly, on every Monday, by the departments of General Medicine, Medical Emergency, Pediatrics including its Emergency Unit, health training centers (UHTC and RHTC) and Microbiology of Government Medical College. The Urban Health Training Centre (UHTC) and Rural Health Training Centre (RHTC) are under the administrative control of Department of Community Medicine, Government Medical

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College, and are involved in clinical care and laboratory diagnosis of patients of notifiable diseases. Mention should be made that the Rural Health Training Centre has become fully operational in February 2006 only. Till January 2006, it was operating through a sub-center on daily OPD basis. Cases reported from various departments which were also confirmed by the microbiology department were excluded from the total reported cases of respective departments in order to avoid duplication of cases. The standardized reporting format included a checklist of priority communicable diseases under NSPCD, along with case definitions and a structured pro forma. The response was adequate, with occasional delays in reporting warranting telephonic or personal communication with the concerned departments by the epidemiologist and/or his team. The team consisted of Senior Lecturer, Demonstrators, Medical Officer and Medical Social Worker. Thus the proper collection of data on prescribed pro forma was ensured by the Community Medicine Department.

The surveillance data were analyzed by using normal test of proportion and time series analysis. Data analysis was done by using MSTAT software.

RESULTS

The surveillance data revealed that a total of 19,378 patients (10,759 males, 8,619 females) of communicable diseases made use of the hospital services during the reference period. Out of 19,378 cases, 11,575, i.e., more than half, were dealt with by health centers. Table 1 depicts that most of the common and benign morbidity was reported to, and dealt with by, health centers (71.87% of total ARIs and 54.4% of total ADDs), and uncommon and serious morbidities were dealt with by General Medicine Department (55.46% of total tuberculosis and 62.51% of total hepatitis cases). Majority of pneumonia (90.54% of its total) and typhoid (35.3% of its total) cases were seen by the Pediatric Department. Department of Microbiology only gives reports of

Table 1: Department-wise morbidity at GMCH*, Chandigarh

Diseases	*Medicine*	*Med. Emeg.*	*Pediatrics*	*UHTC†*	*RHTC‡*	*Microbiology*	*Total*
§ARIs	00	98 (0.85)	3139 (27.25)	5777 (50.16)	2501 (21.71)	3 (0.03)	11518 (100)
		(0.09)	(52.42)	(73.42)	(67.48)	(0.008)	(59.43)
¶ADDs	06 (0.1%)	746 (12.89)	1806 (31.21)	2020 (34.91)	1128 (19.49)	80 (1.38)	5786 (100)
	(0.02)	(0.13)	(30.16)	(25.67)	(30.44)	(22.04)	(29.86)
Tuberculosis	170 (30.91)	135 (24.55)	59 (25.76)	06 (1.09)	62 (11.27)	118 (21.45)	550 (100)
	(0.31)	(0.25)	(0.98)	(0.0008)	(1.67)	(32.51)	(2.84)
Pneumonia	6 (1.01)	15 (2.53)	536 (90.54)	22 (3.72)	13 (2.2)	00	592 (100)
	(0.01)	(0.03)	(8.9)	(0.003)			(3.06)
Hepatitis	161 (49.1)	44 (13.41)	73 (22.26)	2 (0.61)	00	48 (14.63)	328 (100)
	(0.49)	(0.13)	(1.2)	(0.0003)		(13.22)	(1.69)
Typhoid	00	17 (7.42)	81 (35.37)	35 (15.28)	00	96 (41.92)	229 (100)
		(0.07)	(1.35)	(0.004)		(26.45)	(1.18)
‖AFP	00	00	103 (100)	00	00	00	103 (100)
			(1.72)				(0.53)
Others	00	54 (19.89)	191 (70.22)	7 (2.57)	2 (0.74)	18 (6.6)	272 (100)
		(0.2)	(3.19)	(0.009)	(0.0005)	(4.96)	(1.4)
Total	343 (1.77)	1109 (5.72)	5988 (30.9)	7869 (40.6)	3706 (19.12)	363 (1.87)	19378 (100)
	(100)	(100)	(100)	(100)	(100)	(100)	(100)

*GMCH = Government Medical College and Hospital. †UHTC = Urban Health Training Centre. ‡RHTC = Rural Health Training Centre. §ARIs = Acute respiratory infections. ¶ADDs = Acute diarrheal diseases. ‖AFP = Acute flaccid paralysis

investigations. Majority of patients, i.e., 11,518 (59.43%) were suffering from acute respiratory infections (ARIs); followed by acute diarrheal diseases (ADDs) - 5,786 (29.86%). As many as 272 cases (1.4%) of 'Others' included cholera, shigellosis, malaria, Japanese encephalitis, meningococcal meningitis, chickenpox, plague, diphtheria, measles, dengue, pertussis, mumps and neonatal tetanus. The proportion of tuberculosis and pneumonia was found to be higher among males, but it was not statistically significant [Table 2]. However, typhoid showed a statistically significant male predilection.

Percentile diagram represented in Figure 1 shows that overall reported morbidity was maximum (7,132) during summer, followed by 6,718 in winters and 5,528 in the rainy season. Differences were not statistically significant. Most [512 (86.49% of its total)] cases of pneumonia and least cases of typhoid (22.27% of its total) were reported in winter, while those of ADDs (45.06% of its total) were maximum in summer. Seasonal differences of morbidities due to above-mentioned diseases were found to be statistically significant. An overall increase in reported annual number of patients belonging to each group of diseases during the present study's reference period can be observed in both sexes [Table 3].

Table 2: Comparisons of seasonal morbidity trends

Diseases	*I and II*	*I and III*	*II and III*
Acute respiratory infections	*P* <0.001	*P* <0.001	*P* <0.001
Acute diarrheal diseases	*P* <0.001	*P* <0.001	*P* <0.001
Tuberculosis	*P* <0.001	*P* <0.001	*P* =0.016
Pneumonia	*P* <0.001	*P* <0.001	*P* <0.001
Hepatitis	*P* =0.21	*P* <0.001	*P* <0.001
Typhoid	*P* <0.001	*P* <0.001	*P* <0.001
Others	*P* =0.02	*P* <0.001	*P* <0.001

I = November 2005 - February 2006, II = March - June 2005, III = July - October 2005

Seasonal indices obtained in Table 4 reveal the seasonal effects on the spread of communicable diseases. ARIs, pneumonia showed seasonal swings in winter, having seasonal indices

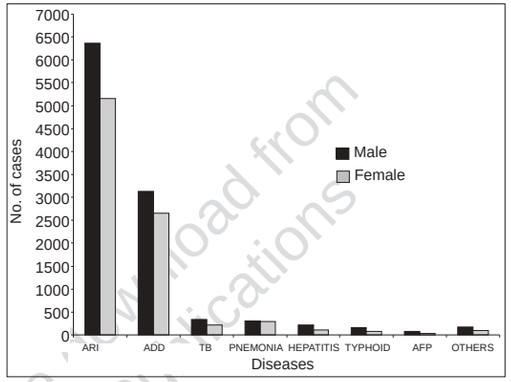

Figure 1: Sex wise distribution of diseases

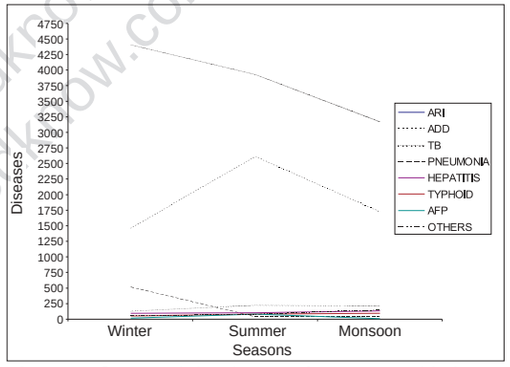

Figure 2: Seasonal distribution of communicable diseases at GMCH, Chandigarh

Table 3: Comparative statement of annual morbidity

Diseases	*2005-2006*	*2004-2005*	*2003-2004*
ARIs	11518 (59.44)	10144 (63.14)	9166 (65.07)
ADDs	5786 (29.86)	4330 (26.95)	3586 (25.46)
Tuberculosis	550 (2.84)	605 (3.77)	576 (4.09)
Pneumonia	592 (3.06)	406 (2.53)	328 (2.33)
Hepatitis	328 (1.69)	305 (1.90)	128 (0.91)
Typhoid	229 (1.18)	140 (0.87)	122 (0.87)
Others	272 (1.4)	137 (0.84)	180 (1.27)
Total	19378	16067 (100.00)	14087 (100.00)

ARIs = Acute respiratory infections, ADDs = Acute diarrheal diseases

Table 4: Seasonal effects on the spread of communicable diseases

	Time series analysis			Seasonal index
Ac. Resp. Infns.	2002-2003	2003-2004	2004-2005	
Winter	3987	3481	4413	115.6
Summer	2661	3194	3931	95.2
Monsoon	2518	3469	3174	89.1
Ac. Dirr. Dis.				
Winter	755	855	1455	67.1
Summer	1993	2098	2607	146.6
Monsoon	838	1377	1724	86.2
Tuberculosis				
Winter	199	143	127	81.8
Summer	249	190	217	113.9
Monsoon	128	268	206	104.6
Pneumonia				
Winter	161	208	512	199.2
Summer	75	100	34	47.3
Monsoon	92	98	46	53.3
Hepatitis				
Winter	55	94	97	96.8
Summer	27	107	100	92.1
Monsoon	46	104	131	110.6
Typhoid				
Winter	15	23	51	54.3
Summer	48	60	84	117.2
Monsoon	59	57	94	128.2
Others				
Winter	37	44	50	66.4
Summer	72	36	76	93.2
Monsoon	72	57	146	139.4

115.6 and 199.2 respectively. Pneumonia was expected to be having almost twice the incidence during winter as compared to normal incidence. Diseases like ADDs, TB had seasonal swings in summer represented in Figure 2. Hepatitis and some other diseases had seasonal swings during monsoon.

DISCUSSION

Department-wise segregation of the patients shows that maximum load of common and mild diseases (71.87% of total cases of ARIs and 54.4% of total cases of ADDs) was borne by health centers. In the absence of the latter, all these cases would have been seen by specialty departments, which in turn would have diluted the quality of care given to the patients by the specialist doctor due to his/her engagement in, and time devotion to, seeing patients having common and mild illnesses. He/she then would not have time to adequately deal with serious patients. The Department of Pediatrics dealt with 27.25% of the total cases of ARIs and 31.21% of the total cases of ADDs. Majority of these cases would have been dealt with by Community Physicians in the hospital itself if provision of General OPD were to be made in its premises. The health center commanded by the Department of Community Medicine thus performs a function of 'clinical screening.' In the present study, out of 19,378 total cases of various infectious diseases, the most common morbidity was ARIs, followed by ADDs - comprising 59.43 and 20.86% of total cases respectively. Similar pattern has been documented in other national-level reports.[4,5] John *et al.,* also observed acute dysentery to be the commonest morbidity in Kerala as they had not included ARIs in their study.[6] The proportion of ARI cases observed by other investigators ranges from 30 to 50% of total.[7,8] In our study, ADDs accounted for 30.16% of the total reported pediatric infections. According to the surveillance report from Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, cases of ADDs constituted 65.84% of all major communicable diseases.[9] Similar analysis of our data with the exclusion of ARI cases results in ADDs making up a sizeable 73.6% of all reported diseases. Pneumonia as a proportion of diarrhea in our study is 10.23%, which is same as that observed by others, viz., 10%.[10]

In our study, tuberculosis accounts for 2.84% of all communicable diseases. Higher figures have been reported in other areas of the

country.[11,12] Though more males have been shown to be suffering from tuberculosis in Kolkata,[13] no significant gender difference is seen in our analysis. Typhoid cases in this study make up only 1.18% of the total. This percentage prevalence is lower as compared to similar figures in Delhi (1.5%)[11] and other areas (4.6%).[12] However, in the same hospital, the cases of typhoid (and also of viral hepatitis) have increased as compared to those found in 2002-03.[14] Typhoid remains a significant health problem, even in developed countries.[15] In outbreaks, typhoid rates have been shown to be as high as 21.6% in the urban setting.[16] These differences may be due to differences in the quality of water and foods at the various mentioned places. The proportion of hepatitis was 1.69% of total cases in our study. It is almost four times than that reported (0.5%) in slums of Delhi.[12] In a later study, rainy season cases were not included.

Clustering of communicable disease morbidity is known to follow a seasonal trend. The incidence of ARIs has been significantly higher, in this study, during winter season. In fact, climatic conditions have been identified as one of the important risk factors for respiratory tract infections.[17-19] Pneumonia, in particular, has shown a major surge during the winter in this area. This finding is as per the expectations, as pneumonia is nothing but a severe form of ARI. Seasonal variations in ADD cases documented by PGIMER, Chandigarh,[9] have also been seen to be statistically significant, as in this report. Similar pattern was observed by Mondal *et al.* in West Bengal.[20] Having more number of patients of pulmonary tuberculosis in summer and rainy seasons may be explained by the treatment seeking behaviour of such cases.

There is no significant difference in reporting of hepatitis cases between summer and winter. The same has been observed in a study in Delhi.[21] Typhoid has been observed to show high variations in its seasonal occurrence in this study, as is documented by others.[22]

CONCLUSION

The study concludes that a large number of cases worth treating at the primary care level are also included in reported cases, increasing avoidable patient load at the tertiary care level. It is suggested that health care delivery system should be remodeled/ restructured in order to make efficient use of tertiary care for actually needy patients only. This will lead to improvement in the quality of care provided to patients by specialists. Proper referral from health centers to hospitals and feedback from hospitals to health centers will also strengthen the quality of patients' care. Strengthening of existing health centers, establishment of general OPDs in the newly coming up medical college hospitals and thrust on proper referral and feedback of patients are also suggested as patients directly approach the tertiary care institutions in some cases and denial to provide services to them has some ethical consequences.

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