
CBHI

TRENDS IN INCIDENCE
OF
DIPHTHERIA IN DELHI

TECHNICAL
STUDIES

By

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Series
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CENTRAL BUREAU OF HEALTH INTELLIGENCE
DIRECTORATE GENERAL OF HEALTH SERVICES,
MINISTRY OF HEALTH AND FAMILY PLANNING
NEW DELHI

January, 1971

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OF
DIPHTHERIA IN DELHI

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By

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Opinions and views expressed in this publication are those of authors and not necessarily of Government of India.

Trends in Incidence of Diphtheria in Delhi.

BY

S.K. Sengupta and P.N. Kapoor.

1.0 Introduction

Diphtheria is one of the most important communicable diseases and is one of the leading causes of sickness and death amongst children. Analysis of data regarding indoor patients and deaths among them reported by 9 States and 4 union territories during 1962-64 shows that Diphtheria with a contribution of 1.76% to total institutional mortality is one of the 20 principal causes of death in the country. Diphtheria accounted for 2.76% of total indoor deaths in Tripura, 2.28% in Madhya Pradesh, 2.18% in West Bengal, 1.84% in Tamil Nadu, 1.74% in Mysore, 1.63% in Uttar Pradesh, 1.43% in Rajasthan, 1.32% in Orissa and 1.12% in Punjab (3). Similarly, diphtheria accounted for 0.49% of total indoor cases treated in 9 States and 4 union territories during 1962-64. It accounted for 1.10% of total indoor cases in West Bengal, 1.08% in U.P., 0.58% in Tripura, and 0.52% in Mysore during 1962-64. Under the scheme of medical certification of cause of death, diphtheria accounted for 0.30% of total deaths in Bombay, 1.46% in Nagpur, 0.42% in Poona and 1.24% in Rajasthan during 1962-64. The overall contribution of diphtheria to total mortality for all these areas combined was 0.50% (2). In this publication, an attempt has been made to describe the trends in incidence of diphtheria in Delhi. The data has also been used to highlight age and sex distribution and seasonal variation in incidence of diphtheria.

2.0 Materials and Methods

Central Bureau of Health Intelligence brought out a report in 1964 on incidence of diphtheria in Delhi covering the period from 1954 to 1962. The present study covers the period 1964-1969. The data collected from Major Hospitals of Delhi viz. I.D., Irwin, Folicc, Safdarjang, Willingdon and Lady Hardinge Medical College Hospitals has been processed and analysed to (1) describe trends in incidence of diphtheria, (2) age and sex distribution of cases and deaths of diphtheria, (3) age and sex specific attack and Death Rate, and Case fatality Ratios and (4) variation in incidence over months i.e. seasonal index. Since the data relates only to admissions and indoor deaths of diphtheria in few Major Hospitals of Delhi, the various Rates and Ratios given in this paper do not represent the population of Delhi. The available data has been used only to highlight a broad pattern of the disease.

3.0 Trends

3.1 During 1954-69

During 1954-62 highest admissions for Diphtheria relating to residents of Delhi in I.D. and Safdarjang Hospital were recorded during 1961 i.e. 1618, followed by the years 1959, 1960, 1962 and 1957 with the figures of 1591, 1553, 1335 and 1329 respectively. In general, a rising trend was observed from 1954 to 1961 with a drop in 1962 in the Morbidity rates. The lowest Morbidity Rate i.e. Cases per Lakh of population of 33.58 was recorded in 1954 and the higher figures of 58.34, 64.26 and 60.13 were recorded in 1957, 1959 and 1961 respectively. In the present study 1300 admissions for Diphtheria were recorded for residents of Delhi in I.D. and Safdarjang Hospitals ^{in 1964.} The figure declined sharply in

subsequent years to 1070 in 1966, 416 in 1967 and to 279 in 1969.

The decline in mortality according to indoor death for Diphtheria in I.D. and Safdarjang Hospitals has been much less than for admissions. Number of total indoor deaths varied from 62 in 1954 to 101 in 1956 during the period 1954-62 with the mean annual figure of 82 deaths. During the period 1964-69 the figure of annual deaths from Diphtheria varied from 47 in 1969 to 109 in 1964 with the mean figures of 87 deaths in I.D. and Safdarjang Hospitals.

3.2 Trends during 1964-69

Trends in incidence during 1954-69 in the preceding section have been described on the basis of indoor admissions only in I.D. and Safdarjang Hospitals relating to residents of Delhi. The earlier study covering the period 1954-62 showed that 7% of the total admissions related to the persons from outside Delhi and the same proportion of non-resident patients was used to estimate cases from Delhi population for the period 1964-69. The present study covers four more hospitals in addition to I.D. and Safdarjang Hospitals. No case of Diphtheria in Willingdon and Police Hospital was admitted during 1964-69 (Table 2). Only 63 cases with 5 deaths were recorded in Irwin Hospital and 6 cases in Lady Hardinge Medical College and Hospital. Thus, out of 5071 cases, 4453 (87.8%) were recorded in I.D. Hospital, 549 (10.8%) in Safdarjang Hospital, 63 (1.3%) in Irwin Hospital and 6 (0.1%) in Lady Hardinge Medical College & Hospital.

Case rate per lakh population of 45.24 was recorded in 1964 (Table I). The rate recorded a sharp decline in subsequent years and it came down to 39.76 in 1965, 13.01 in 1967 and 8.07 in 1969. The average annual case rate of 24.42 was recorded during 1964-69 (Table I). During the period an average death rate per lakh population of 2.71 was recorded. The rate declined from 3.786 in 1964 to 3.066 in 1966, 2.482 in 1968 and 1.341 in 1969.

The decline in cases treated for Diphtheria is partly due to elimination of cases diagnosed on clinical grounds alone because since 1967 only established cases of Diphtheria are admitted in I.D. Hospital.

Anti-diphtheria inoculations are being carried out in such areas as have been earmarked for increased incidence from a study of the cases admitted in the I.D. Hospitals from different parts of the city. A triple-antigen campaign was also carried out by the authorities of the Central Government Health Scheme in collaboration with the Municipal Corporation of Delhi in Subzimandi area. Triple antigen inoculations are also being given through the Maternity and Child Welfare Centres run by the local bodies in Delhi. The number of Diphtheria inoculations done in Delhi are given below :-

1965	299106
1966	204844
1967	188102
1968	115084
1969	136971

3.2.1 The admissions for Diphtheria have been related to admissions for all diseases and beds in the hospitals to examine whether the increase in the number of beds has affected the admission rate for Diphtheria. Table 3 gives proportionate case rate for Diphtheria and number of Diphtheria admissions per bed for the period 1964-69. The total bed strength of I.D., Irwin, Safdarjang and Lady Hardinge Medical College & Hospital, has increased from 2914 in 1964 to 2955 in 1967 and 3065 in 1969. Proportionate case rate (PCR) for Diphtheria i.e. admissions for Diphtheria expressed as percentage of total admissions for all diseases, declined from 1.19% in 1964 to 0.98% in 1966, to 0.3% in 1968 and 0.24% in 1969. The average figure for the period 1964-69 was 0.71% (Table 3). Similarly, number of Diphtheria cases per bed has declined from 0.48 in 1964 to 0.39 in 1966, 0.15 in 1968 and to 0.10 in 1969 for all the four hospitals combined. Further

details may be seen in Table 3. Thus, it would be seen that admissions due to Diphtheria have registered a decline both in respect of proportionate case rate and average number of Diphtheria admissions per bed during the period 1964-69.

4.0 Age distribution of cases & deaths

Table 4 presents age and sex distribution of cases and deaths of Diphtheria during the period 1965-69. Out of 3608 cases recorded in the 5 year period, 1752 cases (48.6%) were in the age group 1 to 4. The next age groups in order were 5-9 (20.9%), below 1 (13.2%) and 10-14 (6.2%). Thus, the age group 0-14 accounted for 88.9% of total admissions and the age group 15 and above accounted for the rest of the cases i.e., 11.1%. The corresponding figures of percentage share of in cases of different age groups were 13.8, 32.8, 18.2, 8.7, 5.9, 12.8, and 8.0 for the age groups below 1, 1-4, 5-9, 10-14, 15-19, 20-29 and 30 and above observed for the period 1954-62. Ref.(1).

Similarly, the highest number of deaths were recorded in the age group 1 to 4 i.e., 65.1%, followed by the age group of below 1 (26.2%) and 6.5% in the age group 5 to 9. No death was recorded in the age group 40 and above whereas only 5 deaths were recorded in the age group 15-39 and the remaining number of deaths i.e. 442 (out of total 447 deaths in all age groups) were recorded in the age group 0-14. The age group 0-14 thus accounted for 98.8% of total deaths during the period 1965-69. According to a study of admissions in 10 teaching hospitals by Pattanayak ^{et al} (Ref.4), the age group below 1 accounted for 8% of total admissions due to Diphtheria age group 1-4 accounted for 53% and age groups 5-9, 10-14, and 15-19 accounted for 30%, 6% and 2% respectively. Thus, age group 0-14 was responsible for about 98% of total admissions due to Diphtheria during 1967.

4.1 Age specific case rates

Table 5 gives case rates per lakh of population for Diphtheria for the period 1965-69. It will be seen from the table that highest attack rate of 74.60 per lakh population was recorded in the age group 0-4, followed by the age group 5-9 (32.93), age group 10-14 (10.98) and age group 15-19 (5.30). The rate continues to decline with the increase in age and the lowest rate of 0.97 is recorded in the age group 60 and above. It will be further seen from the table 5 that the decline in general morbidity due to Diphtheria is reflected in each age group during 1965-69, the greatest decline having been recorded in the age group of 40-59.

4.2 Age specific death rates

The highest death rate per 100,000 population was recorded in the age group 0-4, i.e., 13.65, followed by the age group 5-9 and 10-14 with death rates of 1.27 and 0.25 respectively. Death rate of 0.05 was recorded in the age group 15-19 and a higher figure of 0.09 was recorded in the age group 20-29 and also in the age group 30-39. Death rate of 0 was recorded in the age group of 40 and above (Table 6). The decline in death rate due to Diphtheria during 1965-69 is recorded almost in each age group.

5.0 Sex distribution of cases and deaths

During the period 1965-69 out of total admissions due to Diphtheria of 3008, males accounted for 2218 admissions (61.5%) and females accounted for the rest of admission i.e. (38.5%) (Table 4). In each year males accounted for more admissions as compared to females. Almost similar figure i.e. 39.3% for females was observed by S. Pattanayak et al (4).

5.1 Sex specific case rates

For the period 1965-69 an attack rate of 22.62 per 100,000 population was recorded for males as compared to

17.78 for females. Higher case rate was recorded for males than for females in each year except in 1966 when higher rate was recorded for females (Table 5). It may further be seen from this table that higher attack rates for males were recorded in the age groups 0-4, 5-9, 10-14, 15-19, 40-49 and 60 and above whereas lower figures were recorded in other age groups. Details may be seen in Table 5.

5.2 Sex specific death rates

Higher death rates for males were recorded as compared to females for each year during the period 1965-69 except in 1966. For 1965-69, a death rate of 2.70 per 100,000 of population was recorded for males as compared to a lower figure of 2.32 for females. Higher death rates for males were recorded in the age groups 1-4, 10-14, 15-19 and 30-39. The details may be seen in Table 5.

Since the data is not representative of the total population of Delhi, no attempt has been made to test the statistical significance of differences in age and sex morbidity or mortality rates.

6.0 Case fatality rates

The case fatality rate (CFR) i.e., number of deaths expressed as percentage of cases of Diphtheria, has registered an upward trend since 1954. An average figure of 6.5% was recorded for the period 1954-62 which has risen to 11.2% in the period 1964-69. A figure of 8 to 9% was recorded during 1954-62 which increased to 16 to 21 during 1967-69 (Table 1). This may be chiefly due to the fact that in I.D. Hospital only established cases are admitted since 1967 as already mentioned.

Case fatality rates by age and sex are presented in Table 7. The case fatality rate decreases as the age increases. The highest CFR of 18.30% was recorded in the age group 0-4, followed by the age groups 5-9 (2.8%), 10-14 (2.25%) and 20-29 (1.92%). Further higher figure of CFR was recorded

for females as compared to males during 1964-69. In some years like 1966 and 1969, higher figures of CFR was recorded for males. Details may be seen in Table 7. S. Pattanayak et al also observed a CFR of 13.9% on the basis of data from 10 teaching hospitals in 1967 (Ref.4). The highest CFR was observed by them to be in the age group below 1 (37.5%) followed by the age groups 1-4 (15.4%) and 5-9 (7.7%).

7.0 Seasonal variations

There is a great deal of variations in incidence of Diphtheria from month to month. It was observed that highest incidence of Diphtheria was reported in the month of September followed by months of October, August and November whereas the lowest incidence was recorded in February, March and April during 1954-62. (Ref.I). Nearly 52% of total annual cases were recorded during the four month period August to November during 1954-62. During 1964-69, 57% of total annual cases were recorded in the same four month period (Table 8). The figures of seasonal index, given under column 16 of Table 8 have been worked out on the basis of average (Arithmetic Mean) percentage contribution of each month to total annual cases during the period 1964-69. While calculating the figure of seasonal index, the corrections for differences in number of days from month to month were also applied. The figures of monthly seasonal index were adjusted so that the total of twelve monthly figures is 1200. Thus if there is no seasonal variation, a figure of 100 for seasonal index for each month would be expected. It may be seen that highest seasonal index of 211.33 was recorded for the month of September followed by months of October (187.20), August (176.97) and November (126.14). The lowest figure of seasonal index was recorded for the months of February, March and April. Further details may be seen in Table 8.

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- 1) Patnaik, K.C. and Kapoor, P.N.; ^{Some} observations on Diphtheria in Delhi, published in Indian Journal of Public Health; Vol. XI.No.2; April, 1967.
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- 4) Pattanayak S, et. al (1971). The journal of communicable diseases; October 1971.
- 5) D.G.E.S, CBHI - Technical Studies, Series 2, Progress in the field of health in the Union Territory of Delhi during the plan period, Monthly Surveillance report, 1970.

8.0 SUMMARY

The data collected from major hospitals of Delhi viz. I.D., Irwin, Police, Safdarjang, Millington and Lady Hardinge Medical College and Hospital has been processed and analysed to (1) describe trends in incidence of Diphtheria, (2) age and sex distribution of cases and deaths of Diphtheria, (3) age and sex specific attack and death rates and case fatality ratios, and (4) variation in incidence over months i.e., seasonal index.

8.1 Case rate per lakh population of 45.24 was recorded in 1964 (Table I). The rate recorded a sharp decline in subsequent years and it came down to 39.76 in 1965, 13.01 in 1967 and 8.07 in 1969. The average annual case rate of 24.42 was recorded during 1964-69 (Table I). During the period an average death rate per lakh population of 2.71 was recorded. The rate declined from 3.786 in 1964 to 3.066 in 1966, 2.482 in 1968 and 1.341 in 1969. The decline in cases treated for Diphtheria is partly due to elimination of cases diagnosed on clinical grounds alone, i.e. because since 1967

only established cases of Diphtheria are admitted in I.D. Hospital.

8.2 Proportionate case rate (PCR) for Diphtheria i.e., admissions for Diphtheria expressed as percentage of total admissions for all diseases, declined from 1.19% in 1964 to 0.98% in 1966, to 0.3% in 1968 and 0.24% in 1969.

8.3 Out of 3608 cases recorded in the 5 year period, 1752 cases (48.6%) were in the age group 1 to 4. The next age groups in order were 5-9 (20.9%), below 1 (13.2%) and 10-14 (6.2%). Thus, the age group 0-14 accounted for 88.9% of total admissions and the age group 15 and above accounted for the rest of the cases i.e., 11.1%.

8.4 The group 0-14 accounted for 98.8% of total deaths during the period 1965-69.

8.5 Highest attack rate of 74.60 per lakh population was recorded in the age group 0-4, followed by the age group 5-9, (32.93), age group 10-14 (10.98) and age group 15-19 (5.30).

8.6 The highest death rate per 100,000 population was recorded in the age group 0-4 i.e. 13.65, followed by the age groups 5-9 and 10-14 with death rates of 1.27 and 0.25 respectively.

8.7 During the period 1965-69 out of total admissions due to Diphtheria of 3608, males accounted for 2218 admission (61.5%) and females accounted for the rest of admission i.e. (38.5%).

8.8 For the period 1965-69 an attack rate of 22.62 per 100,000 population was recorded for males as compared to 17.78 for females.

8.9 For the period 1965-69, a death rate of 2.70 per 100,000 of population was recorded for males as compared to a lower figures of 2.32 for females.

case fatality rate

8.10 An average case fatality rate of 6.5% was recorded for the period 1954-62 which has risen to 11.2% in the period 1964-69.

8.11 The case fatality rate decreases as the age increases. The highest CFR of 18.30% was recorded in the age group 0-4, followed by the age group 5-9 (3.8%), 10-14 (2.25%) and 20-29 (1.92%).

8.12 Highest seasonal index of 211.33 was recorded for the month of September followed by months of October (187.20), August (176.97) and November (126.14). The lowest figures of seasonal index were recorded for the months of February, March and April.

(i)

Table No.1 Case Rate, Death Rate and Case Fatality Rate for Diphtheria from 1964 to 1969.

.....

Year	Case	Death	Case Rate per 100,000 population	Death Rate per 100,000 population	Case fatality (%)
1964	1,410	118	45.24	3.786	8.369
1965	1,294	107	39.76	3.288	8.269
1966	1,162	104	34.26	3.066	8.950
1967	459	98	13.01	2.777	21.3508
1968	439	91	11.97	2.482	20.7289
1969	307	51	8.07	1.341	16.6124
TOTAL	5,071	569	24.42	2.741	11.2207

Notes:- 1. Data relates to Hospitals:-
1) I.D. Hospital
2) Irwin Hospital
3) L.H.M.C. & Hospital
4) Police Hospital
5) Safdarjung Hospital
6) Willingdon Hospital.

2. Case fatality rate is No. of deaths expressed as percentage of cases.

(ii)

Table No. 2 Cases and Deaths of Diphtheria in Delhi from 1964 to 1969.

.....

Year	I.D. Hospital		Irwin Hospital		L.H.M.C. & Hospital		Police Hospital		Safdarjung Hospital		Willingdon Hospital		Total	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D
1964	1284	109	10	1	2	-	-	-	114	8	-	-	1410	118
1965	1098	90	5	-	-	-	-	-	191	17	-	-	1294	107
1966	983	93	11	1	-	-	-	-	168	10	-	-	1162	104
1967	417	89	11	3	1	-	-	-	30	6	-	-	459	98
1968	399	87	19	-	3	-	-	-	18	4	-	-	439	91
1969	272	47	7	-	-	-	-	-	28	4	-	-	307	51
TOTAL	4453	515	63	5	6	-	-	-	549	49	-	-	5071	569

(iii)

Table No.3 Proportionate Population/case rate and cases of Diphtheria admitted per bed, 1961-1969.
.....

Year	I.D. Hospital					Irwin Hospital					Safdarjung Hospital				
	No. of Beds	Indoor cases (All diseases)	Diphtheria cases.	Diphtheria cases per Bed	Proportional case rate for Diphtheria %	No. of Beds	Indoor cases (All diseases)	Diphtheria cases.	Diphtheria cases per Bed	Proportional case rate for Diphtheria %	No. of Beds	Indoor cases (All diseases)	Diphtheria cases	Diphtheria cases per Bed.	Proportional case rate for Diphtheria %
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1964	175	4952	1234	7.337	25.93	1068	45302	10	0.009	0.002	1107	43263	114	0.103	0.236
1965	175	5628	1098	6.274	19.51	1068	41579	5	0.005	0.001	1142	47964	191	0.167	0.393
1966	175	5197	983	5.617	18.92	1063	41917	11	0.010	0.003	1142	50447	168	0.147	0.333
1967	175	4794	417	2.383	8.70	1068	43512	11	0.010	0.003	1142	49681	30	0.026	0.060
1968	175	4070	399	2.230	9.80	1103	46168	19	0.017	0.004	1142	48245	18	0.016	0.037
1969	175	4669	272	1.554	5.83	1103	49517	7	0.006	0.001	1207	49993	28	0.023	0.056
Total (1961-60)	1050	29310	4453	4.241	15.19	6478	268495	63	0.010	0.002	6882	294593	549	0.030	0.186

(Contd.)

(iv)

Year	Lady Hardinge Medical College and Hospital					TOTAL				
	No. of Beds	Indoor cases (All diseases)	Diphtheria cases	Diphtheria cases per Bed	Proportional case rate for Diphtheria %	No. of Beds	Indoor cases (All diseases)	Diphtheria cases	Diphtheria cases per Bed	Proportional case rate for Diphtheria %
(0)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)
1964	564	19560	2	0.0035	0.0102	2914	118577	1410	0.4839	1.1891
1965	564	19171	-	-	-	2919	111650	1294	0.4388	1.1287
1966	570	20525	-	-	-	2955	118086	1162	0.3932	0.8940
1967	570	22127	1	0.0018	0.0045	2955	120114	459	0.1553	0.3821
1968	570	22066	3	0.0053	0.0136	2990	120549	439	0.1468	0.3612
1969	580	22758	-	-	-	3065	126937	307	0.1002	0.2419
Total (1961-69)	3418	126515	6	0.0018	0.0047	17828	718913	5071	0.2844	0.7054

(v)

Table No. 4 Indoor cases and deaths for Diphtheria by age and sex, 1965-1969
(Combined totals for I.O., L.H.M.C., Police, Safdarjung and Willingdon Hospitals).

Year	Sex	Below 1		1-4		5-9		10-14		15-19		25-29		30-39		40-49		50-59		60 & above		Total	
		C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
1965	M	97	23	356	38	164	2	66	-	45	-	27	1	28	-	17	-	2	-	4	-	906	64
	F	50	16	212	20	116	5	26	1	8	-	39	1	24	-	4	-	3	-	1	-	483	43
	T	147	39	568	58	280	7	92	1	53	-	66	2	52	-	21	-	5	-	5	-	1239	107
1966	M	70	14	294	39	155	4	32	-	15	-	31	-	13	-	7	-	2	-	-	-	619	57
	F	50	11	218	35	128	-	53	-	18	-	36	-	23	-	6	-	-	-	-	-	532	46
	T	120	25	512	74	283	4	85	-	33	-	67	-	36	-	13	-	2	-	-	-	1151	103
1967	M	36	9	205	42	86	2	13	2	3	1	4	-	1	-	-	-	-	-	-	-	348	56
	F	26	8	37	23	11	8	13	-	2	-	7	-	3	-	-	-	1	-	-	-	100	39
	T	62	17	242	65	97	10	26	2	5	1	11	-	4	-	-	-	1	-	-	-	448	95
1968	M	34	10	171	38	46	3	7	1	2	-	3	-	-	-	-	-	-	-	-	-	263	52
	F	31	10	94	26	18	3	5	-	2	-	3	-	2	-	2	-	-	-	-	-	157	39
	T	65	20	265	64	64	6	12	1	4	-	6	-	2	-	2	-	-	-	-	-	420	91
1969	M	53	15	107	20	14	-	3	-	-	-	3	-	1	1	-	-	-	-	1	-	182	36
	F	30	1	58	10	16	2	4	1	4	-	3	1	3	-	-	-	-	-	-	-	113	15
	T	83	16	165	30	30	2	7	1	4	-	6	1	4	1	-	-	-	-	1	-	300	51
TOTAL	M	290	71	1133	177	465	11	121	3	65	1	68	1	43	1	24	-	4	-	5	-	2213	265
	F	187	46	619	114	289	18	101	2	34	-	88	2	55	-	12	-	4	-	1	-	1390	182
	T	477	117	1752	291	754	29	222	5	99	1	156	3	98	1	36	-	8	-	6	-	3608	447
% to Total		13.2	26.2	48.6	65.1	20.9	6.5	6.2	1.1	2.7	0.2	4.3	0.7	2.7	0.2	1.0	0.2	0.2	0.2	100.0	100.0		

M = Male, F = Female, T = Total.

(ii)

Table No. 5

Case rate per 100,000 population of Diphtheria from 1965-69 in Delhi.

Years		0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60 & above	Total
1965	M	160.43	73.07	32.85	23.68	7.65	10.82	10.92	2.40	0.70	41.83
	F	97.54	58.63	15.13	5.18	14.68	13.74	3.96	5.19	1.92	46.45
	T	129.77	66.31	24.68	15.38	10.67	11.99	7.87	3.55	4.40	39.61
1966	M	123.73	66.29	15.29	7.58	8.43	4.82	4.32	2.31	-	32.83
	F	95.69	62.05	23.58	11.17	12.99	12.62	5.69	-	-	35.33
	T	110.06	64.30	21.88	9.19	10.39	7.97	4.86	1.36	-	33.94
1967	M	78.76	35.36	5.97	1.46	1.05	0.36	-	-	-	17.74
	F	21.95	5.12	6.97	1.19	2.43	1.58	-	1.59	-	6.44
	T	51.04	21.18	6.43	1.34	1.64	0.85	-	0.65	-	12.72
1968	M	64.51	18.21	3.01	0.94	0.76	-	-	-	-	12.91
	F	42.23	8.02	2.58	1.15	1.00	1.01	1.75	-	-	9.82
	T	53.64	13.45	2.86	1.03	0.86	0.41	0.69	-	-	11.54
1969	M	48.55	5.34	1.28	-	0.73	0.33	-	-	1.39	8.62
	F	27.97	6.91	1.99	2.21	0.96	1.47	-	-	-	6.98
	T	38.50	6.08	1.61	0.99	0.83	0.79	-	-	0.75	7.89
<u>TOTAL</u>	M	93.02	38.24	11.12	6.31	3.56	3.07	2.85	0.89	1.50	22.62
	F	55.29	26.91	10.83	4.05	6.10	5.80	2.19	1.28	0.35	17.78
	T	74.60	32.93	10.98	5.30	4.65	4.17	2.59	1.05	0.97	20.47

(vii)

Table No. 6 Death Rate per 100,000 Population for Diphtheria in Delhi from 1965 to 1969.

Years		0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60 & Above	Total
1965	M	21.60	0.89	-	-	0.28	-	-	-	-	3.54
	F	13.40	3.53	0.58	-	0.38	-	-	-	-	2.98
	T	17.61	1.66	0.27	-	0.32	-	-	-	-	3.29
1966	M	18.02	1.71	-	-	-	-	-	-	-	3.02
	F	16.42	-	-	-	-	-	-	-	-	3.05
	T	17.24	0.91	-	-	-	-	-	-	-	3.04
1967	M	16.67	0.82	0.92	0.49	-	-	-	-	-	2.86
	F	10.63	3.73	-	-	-	-	-	-	-	2.49
	T	13.72	2.18	0.49	0.27	-	-	-	-	-	2.69
1968	M	15.11	1.19	0.44	-	-	-	-	-	-	2.55
	F	11.88	1.35	-	-	-	-	-	-	-	2.39
	T	13.53	1.62	0.24	-	-	-	-	-	-	2.48
1969	M	10.62	-	-	-	-	0.33	-	-	-	1.70
	F	3.50	0.86	0.50	-	0.32	-	-	-	-	0.89
	T	7.14	0.41	0.23	-	0.14	0.20	-	-	-	1.34
<u>TOTAL</u>	M	16.21	0.90	0.28	0.10	0.05	0.14	-	-	-	2.70
	F	10.97	1.68	0.21	-	0.10	-	-	-	-	2.32
	T	13.65	1.27	0.25	0.05	0.09	0.09	-	-	-	2.53

Notes: Information relates to ^{deaths} in I.D., L.H. & M.C., Police, Safadarjang & Willingdo
Hospitals.
--Nil.

(viii)

Table No. 7 Percentage Case fatality rates for Diphtheria from 1965 to 1969.

Years		0-4	5-9	10-14	15-19	20-29	30-39	40-49	50-59	60 & above	Total
1965	M	13.47	1.22	-	-	3.70	-	-	-	-	7.94
	F	13.74	4.310	3.846	-	2.564	-	-	-	-	8.903
	T	13.57	2.50	1.09	-	3.03	-	-	-	-	8.30
1966	M	14.56	2.58	-	-	-	-	-	-	-	9.21
	F	17.16	-	-	-	-	-	-	-	-	8.65
	T	15.66	1.413	-	-	-	-	-	-	-	8.95
1967	M	21.16	2.33	15.38	33.33	-	-	-	-	-	16.09
	F	49.21	72.73	-	-	-	-	-	-	-	38.61
	T	26.99	10.31	7.69	20.00	-	-	-	-	-	21.16
1968	M	23.41	6.52	14.29	-	-	-	-	-	-	19.77
	F	28.80	16.67	-	-	-	-	-	-	-	24.84
	T	25.45	9.37	8.33	-	-	-	-	-	-	21.67
1969	M	21.87	-	-	-	-	100.00	-	-	-	19.78
	F	12.50	12.50	25.00	-	33.33	-	-	-	-	12.71
	T	18.55	6.67	14.29	-	16.67	25.00	-	-	-	17.00
<u>TOTAL</u>	M	17.42	2.36	2.48	1.54	1.47	2.33	-	-	-	11.95
	F	19.85	6.23	1.98	-	2.27	-	-	-	-	13.09
	T	18.30	3.85	2.25	1.01	1.92	1.02	-	-	-	12.39

Data relates to I.D. Hospital, L.H.M.C. Hospital, Police, Safdarjang & Willing don Hospital.

(x)
Table No. 8 Seasonal variation in Incidence of Diphtheria in Delhi, 1965-69.

Months	1964 %		1965 %		1966 %		1967 %		1968 %		1969 %		Total Mean		Seasonal Index
	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	%	Cases	% age	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
January	84	6.53	53	4.11	61	5.30	33	7.37	15	3.57	22	7.33	268	5.70	67.28
February	67	5.21	55	4.27	58	5.04	29	6.47	10	2.38	12	4.00	231	4.56	59.60
March	61	4.74	57	4.42	77	6.69	22	4.91	8	1.90	8	2.67	233	4.22	49.73
April	83	6.45	64	4.97	76	6.60	12	2.68	10	2.38	17	5.67	262	4.79	58.50
May	83	6.45	94	7.29	74	6.43	19	2.24	17	4.05	13	4.33	300	5.47	64.35
June	81	6.30	74	5.74	63	5.47	13	2.90	15	3.57	16	5.33	262	4.88	59.60
July	78	6.07	68	5.28	64	5.56	25	5.58	23	5.48	28	9.33	286	6.22	73.49
August	180	14.00	146	11.33	174	15.12	45	10.04	82	19.52	60	20.00	687	15.00	176.97
September	200	15.55	189	14.66	225	19.55	91	20.31	84	20.00	42	14.00	831	17.35	211.33
October	208	16.17	213	16.52	143	12.42	92	20.54	71	16.90	38	12.67	765	15.87	187.20
November	94	7.31	169	13.11	92	7.99	45	10.04	52	12.38	34	11.33	486	10.36	126.14
December	67	5.21	107	8.30	44	3.82	22	4.91	33	7.86	10	3.33	283	5.57	65.81
TOTAL	1286	99.99	1289	100.00	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99	
					1151		448		420		300		4894		1200.00

Note: (1) This table covers indoor admissions for the following hospitals:-

- (i) I.D. Hospital.
- (ii) Lady Harding Medical College & Hospital.
- (iii) Police Hospital.
- (iv) Safdarjang Hospital for 1965-69
- (v) Willindon Hospital.

(2) Figures for 1964 exclude those of Safdarjang Hospital as month-wise break-up of cases for this hospital was not available.

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