

INCIDENCE OF H. INFLUENZAE IN A DAY – CARE CENTER*

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SUMMARY: Akçakaya N, Torun MM, Söylemez Y, Sevme R, Çokuğraş H, Ergin S, Pinçe O, Eşkazan G. (Department of Pediatrics, Istanbul University Cerrahpaşa Faculty of Medicine, Istanbul Turkey). Incidence of H. Influenzae in a day-care center. Turk J Pediatr 1996; 38: 289-293.

In this study nasopharyngeal haemophilus influenzae flora of healthy children in a day-care center in Istanbul were analyzed. Nasopharyngeal cultures of 168 children between two and five years of age were obtained between December 1, 1992 and April 1, 1993 and investigated. H. Influenzae was isolated in 104 cultures. H. Influenzae type b (Hib), type f and H. parainfluenzae were found 87 children (51.8%), 15 children (8.9%) and one child (0.6%), respectively, while non-typable H. Influenzae was discovered in one child (0.6%). Hib, which is the cause of invasive H. Influenzae infection in childhood, was evaluated with respect to age; its incidence was found to be highest in two and three-year-old children, and reduced in children older than four years of age. Although Hib was seen in 518 percent of normal children in the day-care center, invasive Hib disease was not seen in any of those children. Therefore, these children have considered carrier of Hib without clinical manifestations. *Key words: H. influenzae, childhood, incidence.*

H. influenzae type b (Hib) is an important cause of severe bacterial infections in children between the ages of one month and three years and is associated with appreciable mortality. Meningitis and epiglottitis are the most common and serious manifestations of invasive H. influenzae type b infection. Non-typable H. influenzae is the major etiologic agent of otitis media, sinusitis and conjunctivitis¹⁻⁴. Socioeconomic factors such as crowded families as well as overcrowding of day-care centers and schools may lead to an increased risk of exposure to H. influenzae type b infections. The relative risk for day-care attendees has also been shown to be much greater than that for the general population⁵⁻¹³.

Due to insufficient routine laboratory evaluations, there are virtually no studies available on the incidence of H. influenzae type b in children in Turkey. The aim

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of the present study was to evaluate the importance of *H. influenzae* type b infections in a day-care center.

Material and Methods

A total of 168 healthy children (71 girls, 97 boys) of medical staff in a day-care center of Cerrahpaşa Medical Faculty were included in the study. The age distribution ranged between two and five years. Children in a day-care center were selected because they provide a defined group at the appropriate age. There was no ongoing systemic *H. influenzae* type b illness in that day-care center.

One nasopharyngeal specimen was obtained from each child between December 1, 1992 and April 1, 1993. Nasopharyngeal specimens were plated onto chocolate agar medium containing fish extract and prepared by adding 18.9 U/ml bacitracin. Furthermore a special disk consisting of X and V factors were also used to provide the requirements for these factors [X factor DD3-V factor DD4 (oxid)]. After identification of *H. influenzae*, encapsulated strains were classified by the polysaccharides of the capsular substance (Wellcome Diagnostic) and designated as types a through f¹⁴⁻¹⁵.

Results

H. influenzae type b was isolated from nasopharyngeal cultures of 87 (51.8%) children (37 girls, 50 boys). *H. influenzae* type f was recovered from 15 (8.9%) children (10 girls, 5 boys). In addition, non-typable *Hemophilus* in one girl (0.6%) and *H. parainfluenzae* in one boy (0.6%) were identified. *H. influenzae* was isolated from 104 (61.9) of 168 cultures, and 64 (38.1%) cultures were negative (Table I).

Table I: Characteristics of *H. influenzae* Strains Cultured from the Nasopharynges of Children in a Day-Care Center (n: 168)

	<i>H. influenzae</i>	Hib	Type f	Non-typable	<i>H. parainfluenzae</i>	Not isolated
Total (n)	104	87	15	1	1	64
Female		37	10	1		23
Male		50	5		1	41
Total (%)	61.9	51.8	8.9	0.6	0.6	38.1

Table II: The Age Distribution of *H. influenzae* Strains

Age (years)	Total n: 168	Hib		Type f	Non-typable	H. para- Influenzae	Not Isolated
		n	%				
2	41	25	15	4			12
3	54	30	18	3		1	20
4	53	21	13	5	1		26
5	20	11	7	2			7

Hib was evaluated with respect to age its incidence being highest in two- and three-year-old children, and reduced in children older than four years of age (Table II).

Discussion

Haemophilus influenzae type b (Hib) was identified in 51.8 percent of children between the ages of two and five years in a day-care center (Table I). This study represents the first analysis of the nasopharyngeal *H. influenzae* flora of normal children in day care.

In a previous study, *Haemophilus influenzae* was isolated in 48 throat or nasopharyngeal specimens of 100 children with upper respiratory tract infections who attended our outpatient clinic¹⁶. Among these 48 children, *H. influenzae* type b was recovered in 37 (77%), *H. influenzae* type c in five (10.4%), *H. influenzae* type e in one (9%), *H. influenzae* type f in 2 (4%) and non-typable strains in three children (6.2%). Sixteen patients (33.3%) with upper respiratory tract infections concurrently had other pathogenic agents such as beta hemolytic streptococci, *S. pneumoniae*, *S. aureus*, *E. coli*, *P. aeruginosa* and *C. albicans*¹⁶. The distribution of Hib incidence in the day-care center varied with age 15 percent in two-year-old, 18 percent in three-year-old, 13 percent in four-year-old and seven percent in five-year-old children. The peak incidence of Hib was observed at three years of age (Table II). Although invasive Hib disease was not observed in any of those children, these children were considered to be carriers of Hib without clinical manifestations.

Incidence rates were 1.3 times higher in boys than in girls. Although the risk of invasive Hib disease was most marked among children less than one year of age, in a study by Istre et al.⁵ the risk was found to increase with age⁴. It has been suggested that day-care centers are the source of repeated exposures with infections due to *H. influenzae*. Prophylaxis with rifampin has proved useful in children more than two years of age⁶⁻⁸. Rifampicin administered to the contacts

eradicates the organism from 96 percent of cases and is also effective in reducing the risk of secondary disease^{7,17-19}. It must be considered that infants and children in early childhood are at risk for *H. influenzae* infection, therefore feeding with breast milk^{4,5} and active immunization with Hib vaccine are recommended¹⁻⁶.

The incidence of non-typable *H. influenzae* was found to be 39 percent in a longitudinal survey of infants followed for four winter months in nurseries in Sweden⁸. Several reports have documented that the rate of the carrier state of Hib without clinical manifestations was 10 percent and may increase to 50 percent in preschool children^{8,20-23}. Children less than seven years of age have the highest nasopharyngeal carriage rate of Hib. Children who are close in age are also more likely to have close contact with each other¹⁰.

The incidence of Hib has 51.8 percent in healthy children in the day-care center, which is not as negligible a rate as it was previously thought to be. This ratio shows that the incidence may be similar to that in western countries, as long as we have the opportunity to use proper and advanced techniques in our routine microbiology laboratories.

In conclusion, this study has revealed a remarkably high incidence of Hib (51.8%) with a peak incidence at three years of age in children in a day-care center in metropolitan Istanbul. Invasive Hib infections were not seen in the children in this day-care center during our one-year investigation period. This suggests that these children are in carrier state of Hib without clinical manifestations.

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