

B-Haemolytic Streptococcal Carrier Among School Age Children

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Aim of the study: To determine the incidence of the carrier of group AB-haemolytic Streptococci among healthy school age children.

Study design: The study was conducted at Saddam Central Teaching Hospital for children from January 1998 to May 1998. One hundred asymptomatic healthy child accompany their mother in the outpatient department included in this study , their age range between 6-12 years , from different resident areas , rural , urban , & sub uraban. Throat swab was taken , & culture done for isolation of B-haemolytic Streptococci.

Results: The percentage of carrier of B-haemolytic Streptococci was twenty four percent (24%). More male than female with high incidence in the age between 8-12 years . There is an obvious effect of socioeconomic state & resident area , also the time of the year when sample was taken . The incidence of carrier also increase if the child has previous history of recurrent pharyngitis .

Keywords: B-hemolytic streptococci, Carriers, School children

Introduction

Haemolytic Streptococci are normal inhabitants of the nasopharynx, prevalence rates vary from 15-20% through out the year. ^[1]

The genus Streptococcus, named by Billoth & Ehrlich (1877) contains a diversity of gram positive cocci characteristically arranged in chains and widely distributed in nature. ^[2]

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Some are carried as normal flora , others are associated with serious human diseases. ^[3]

Group A streptococcus is responsible for the majority of human streptococcal & post streptococcal sequelae & sensitization namely acute rheumatic fever, acute glomerulonephritis & scarlet fever with their significant morbidity and mortality in many parts of the world. ^[4]

It is generally agreed that interaction between factors related to host, micro-organism and environment, determines the incidence and prevalence of streptococcal carriers , infections and post streptococcal sequelae. ^[5,6]

Despite extensive bacteriological and epidemiological studies that have been carried in Europe ^[7,8] , North America ^[9,10] , & few in Middle East ^[11] , the role of healthy carrier in pathogenesis of streptococcal diseases is still controversial . ^[12]

Material & Method

This study was conducted for 5 months from January 1998 to May 1998 .

One hundred asymptomatic healthy child were examined & included in this study for the purpose of our study .A “ carrier “ was defined arbitrarily as a child whose throat culture was positive for B-haemolytic streptococci , but who has no signs or symptoms of streptococcal infection . ^[13]

History was taken from the mother about , age , sex , residence , history of any previous illness especially recurrent pharyngitis , rheumatic fever, glomerulonephritis, skin infection, taking antibiotics , socioeconomic state , condition of the house , & education of the parents .

All the children were screened for symptoms & signs of B-haemolytic streptococcal infection , & exclude any child had these symptoms or signs, also we excluded any child on antibiotics for any reason .

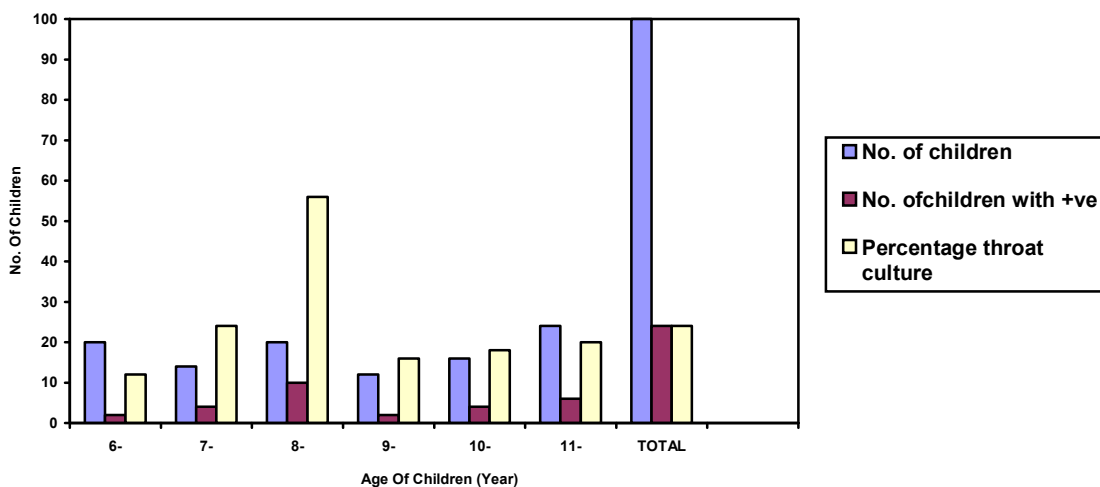
Children with chronic diseases which may affect the immunity were also excluded from the study .All children included in the study were submitted to full physical examination , then each child’s posterior pharyngeal wall & tonsil were swabbed with adry cotton-tipped swab under direct vision with the use of disposable tongue depressor . All throat swabs were send to the laboratory immediately after collection, each swab was streaked out on 10% horse blood agar plate following incubation for 24 hours at 35°c . , and then read the plate, if negative an additional 48 hours incubation were added to identify any strain of B-haemolytic streptococci .

Result

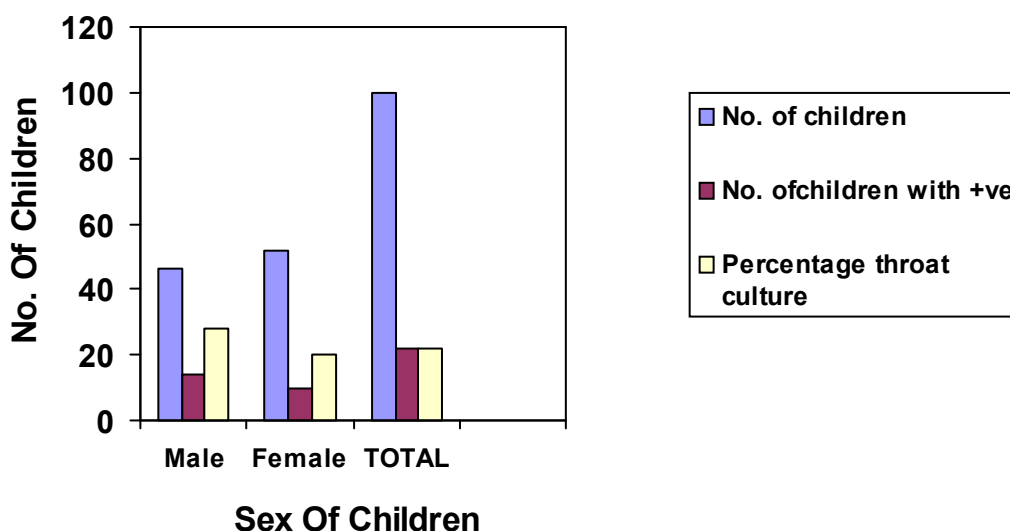
B-haemolytic streptococcal strain was isolated by throat culture in twenty four “24” child out of one hundred “100” , healthy “asymptomatic” child after 24-72 hours.

The peak age for isolation of B-haemolytic streptococci is from 8-12 years as shown in figure 1.

The incidence of carrier male was 29% which was more than female 19.2% as shown in figure 2 .



Fig(1): The age distribution of B-haemolytic streptococcal carriers



Fig(2): The sex distribution of B-haemolytic streptococcal carriers

There is seasonal variation as shown in figure 3.

The resident area show highly significant statistical difference between urban , suburban & rural area as shown in table 1.

Children with history of recurrent pharyngitis show higher incidence of carrier than those with no history of pharyngitis as shown in table 2.

There was no child with history of both glomerulo nephritis and rheumatic fever , but children with history of either diseases show more incidence of B-haemolytic streptococci carrier than those with no history as shown in table 3 .

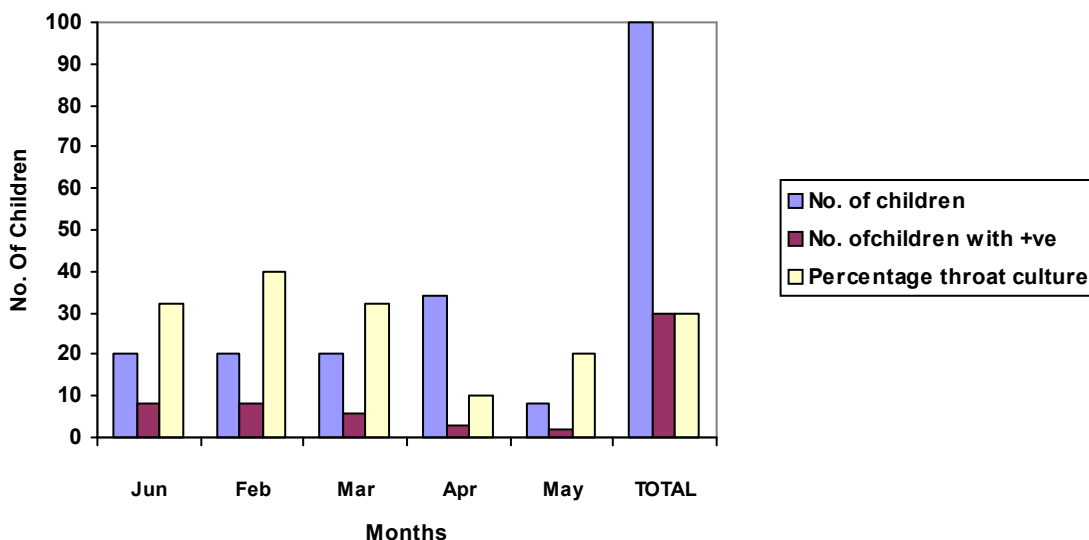


Fig (3): Seasonal variation in isolation of B-haemolytic streptococci

Table 1 :-B.H.S. carrier according to resident area

Resident Area	Number of Children	Number of Children With +ve throat culture	%
Urban	74	8	10.8
Sub-Urban	14	7	50
Rural	12	9	75
Total	100	24	24

$X^2 = 14.9$ d.f. = 2 P.v. = < 0.001 Highly significant

Table 2:-B.H.S. carrier with history of reccurent pharyngitis

	Number of Children	Number of Children With +ve throat culture	%
History of Recurrent Pharangitis	10	8	80
No History of Recurrent Pharangitis	90	16	17.8
Total	100	24	24

$X^2 = 8.4$ d.f. = 1 P.v. = < 0.004 Highly significant

Table 3:-B.H.S. carrier with previous history of non suppurative complication B.H.S.

	Number of Children	Number of Children With +ve throat culture	Percentage
Have History of Both acute Rh.fever or GN.	0	0	0
Have History of either acute Rh.fever or GN.	9	7	77.8
Have No History of acute Rh. Fever or GN.	91	17	18.8
Total	100	24	24

$X^2=7$ d.f. = 1 P.v. = < 0.008 Highly significant

There is high incidence of carrier in low socioeconomic state 50%, while it is less in high socioeconomic state 16.7% ; which is statistically significant as shown in table 4.

There is a great influence of the education of the parents on the incidence of carrier , as shown in table 5.

Condition of the house plays a very important role in increasing the incidence of streptococcal carrier , as shown in table 6.

Table 4:-B.H.S. carrier With Socio-Economic state

Economic State	Number Of Children	Number Of Children With +ve throat culture	%
High Soio-Economic Level	6	1	16.7
Moderate Socio-Economic Level	74	13	17.6
Low Socio-Economic Level	20	10	50
Total	100	24	24

$X^2= 4.96$ d.f. = 2 P.v. = < 0.008 Highly significant

Table 5:-B.H.S. carrier With level of education of the parents

	Number Of Children	Number Of Children With +ve throat culture	%
Parent High Educational level	10	2	20
Parent Moderate Educat. Level	72	10	13.9
Parent Low Educational Level	18	12	66.7
Total	100	24	24

$X^2= 10.9$ d.f. = 2 P.v. = < 0.004 Highly significant

Table 6:-B.H.S. carrier With house condition

House Condition	Number Of Children	Number Of Children With +ve throat culture	Percentage
Crowding House	34	15	44.1
Not Crowding House	66	8	12.1
Total	100	24	24

$X^2 = 79$ d.f. = 1 P.v. = < 0.006 Highly significant

Discussion

Table 7 compares findings of our study to those of similarly conducted studies in other countries, & similar findings were reported [14].

The prevalence of B-haemolytic streptococci at the age 8-12 years in our study was similar to the finding reported by Quinn⁽¹³⁾. It also goes with the age distributed of acute rheumatic fever

Table 7:- B.haemolytic Streptococci carrier rate in normal asymptomatic school children in our study in comparison to similar studies in other countries .

Reference	Country	Number of children	Total "Bhs" carrier rate%
1-Pikeand Fashena(a)	United State	756	42
2-Myers and Koshy(b)	South India	883	49
3-Valkenberg et al (c)	Netherlands	412	51
4-Hana Fish et al (d)	Indonesia	901	21
5-Kaneko et al (e)	Philippines	1236	25
6-Takeucli et al (e)	Japan	15023	21.2
7-Karoui, R., H.A.Majeed (1)	Kuwait	1041	47
8-Present study	Iraq	100	24

Male carrier was more than female, and this might be due to more contact with other population due to their activity and sharing sports and this is consistent with other studies [13].

There was significant prevalence of isolation of B-haemolytic streptococci during cold weather "Jan, Feb,&March" than in April & May and this is consistent with other studies [13,14,15]

In our study we found that there is a very high prevalence of B-haemolytic streptococcal carrier among those children with low socioeconomic state, low educational level of the parents, living in rural area & crowded houses, all these factors together rendering them susceptible to a higher incidence of B-haemolytic streptococcal infection and

consequently a higher incidence of acute rheumatic fever, and this is consistent with other studies [13,14,15]

There is also a high incidence of carrier among those with history of recurrent pharyngitis or, those who had history of diagnosed rheumatic fever or glomerulonephritis with admission to hospital in our study which is consistent with other studies [13,14,15]

References

- 1-Behrman & Vaughan, Nelson Textbook of Pediatrics 13thed 1986 Streptococcal infection, P. 576-580.
- 2- Parker, M.T. Streptococcus & Lactobacillus, Cited in principles of Bacteriology, Virology & Immunity, (1984) Vol.2 Seventh. Edition Arnold.

- 3- Jawetz, E., Melnick, J.I. and Adelburg, E.A., Review of Medical Bacteriology, 1983, Lange Medical Publications.
- 4- P.A.H.O. Prevention & control of Rheumatic fever in the community, 1985.
- 5- Rogers, Desprez, Cline Braun wald, Greenberger, Bondy Epstein and Malawista, Yearbook of Medicine 1984-1986.
- 6- Massel B.F., Chute, C.G. Walker, A.M. & Kurland, G.S. Penicillin & the Marked Decrease in morbidity from R.F. in the U.S., The New Engl. J. of Med. 1988,318,5.
- 7- Szita, J. and Hegyessy, G.,:Type Distribution of Streptococcus Pyogenes Strains in the Year 1964,1965.
- 8- Rotta J.Hejnova M.,Blcova, R.,Curik B.,&Salacova,J.,Surveillance of Haemolytic Streptococci group and type (Streptopyogenese) Distribution over the Territory of Czechoslovakia (afive year study) J.Hgg. Epiden. Microbiol. Imm. 1968, 12.176.
- 9- Rammel kamp C.H., Epidemiologyof Streptococcal Disease . Harvey lecture .1957,1959.51,113.
- 10-Hovser, H.B., Report of the 1968 Seminar on prophlaxis of streptococcal Infection in the Armed Forces, Milit. Med. 1969,134. 1526.
- 11-Community Control of R.H.D. in developing countries : A major Public Health Problem, W.H.O. Chronicle 1980, 34,336-45.
- 12-Kaplan, E.L. Gastanaduy, A.S.,and Huwe, B.B.,The Role of the carrier in Treatment Failures After Anti B.Therapy for Group A Streptococci in Upper Respiratory Tract., J.Lab. Clin. Med. 1981, 8, 3.
- 13-Quinn RW. Carrier rates for Haemolytic Streptococci in School children a six-year study Am.J Epidemiol 1965; 82:1-13.
- 14-R. Karoui, H.A. Majeed, A.M. Yousif, M.A.A. Moussa, S.D.Iskander&K.Hussain, Haemolytic Streptococci and Streptococcal Antibodies in normal school children in Kuwait. American Journal of Epidermiology, 1982,Vol.116, No.4, U.S.A. Jhon Hopkins University School of Hygiene and Public Health.
- 15-F. Khalil, K.M., Mousawi, S.Al-Salloum & R.Al-Mehdi Isolation grouping & Antibiotics Sensitivity of Haemolytic Streptococci from Healthy Population. J.Comm. Med. Iraq – 1989, Vol.2, No.2.

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