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A community based study to assess the microbiological profile and antibiotic sensitivity pattern of conjunctival flora among street children in a city in Eastern India

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Abstract
Introduction: *Normal conjunctival flora play a significant role in keeping the ocular surface healthy. During childhood the conjunctival cul de sac is predominantly inhabited by Haemophilus, non-haemolytic Streptococcus, and Pneumococcus. Street children in this part of the developing world are mostly neglected and have questionable assess to ocular hygiene. This makes them more prone to ocular infections*. ***Materials and Methods:*** *157 street children were included in the study as compared to 143 children with no presenting symptoms for ocular infections who reported to unit A4 OPD in Regional Institute of Ophthalmology Kolkata*. *Microbiological analysis of the collected samples from the inner canthi was done.* ***Results and Analysis:*** *Staphylococcus Aureus was the most common organism isolated among the both the groups(P<0.00 chi Square:23.48). 71.98% of the Street Children were found to have Multiple micro-organisms isolated from their Conjunctival Cul-de –sac as compared to only 37.06% among the control population. The proportion of isolates resistant to fluroquinolones among the Street Children were much less that amongst the control population (Ciprofloxacin: P<0.00 chi Square:16.61, Moxifloxacin: P<0.00 chi Square:85.78, Gatifloxacin: P<0.00 chi Square:81.45, Besifloxacin: P<0.00 chi Square:13.00).* ***Conclusion:*** *Street Children are socially neglected with limited access to medical facilities. The present study is a small step towards documenting the microbiological profile of ocular surface of Street Children.*

Key Words: *Street Children, Conjunctival Flora, Flouroquinolones*

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I. Introduction

Bacteria is present in the eye since birth and remains throughout the life[1]. Normal conjunctival flora remains as commensal organism in the conjunctival sac. These micro organisms play a significant role in keeping the ocular surface healthy. These commensal organisms become pathogenic when the codependence and coregulation with the host is lost[2].

During childhood the conjunctival cul de sac is predominantly inhabited by Haemophilus, non-haemolytic Streptococcus, and Pneumococcus. Bacteria commonly found in the eye in all age groups are the staplylococci especially Staphylococcus epidermidis and the diphtheroids. Anaerobic flora colonise more than that of aerobic organisms. Common anaerobic bacteria colonising the eye are Propionibacterium and Peptostreptococci species[3].

Infections affecting the eye can range from conjunctivitis to dacrocyctitis to vision threatening endophthalmitis. Acute conjunctivitis occurs most frequently in children less than 6 years of age with a peak incidence at 12-36 months[4]. Staphylococcus epidermidis is the most common cause of enophthalmitis in both paediatric and adult population[5]. Staphylococcus aureus, Streptococcus pneumoniae and staphylococcus epidermidis are the most frequent organisms causing dacrocyctitis[6].

Ocular infections especially among the paediatric population pose quite a lot of challenges to the treating Ophthalmologist. A comprehensive knowledge regarding the microbiological nature and antibiotic sensitivity pattern of the commensal organisms of the conjunctival sac may aid Ophthalmologists in efficient management of ocular infections among children. Street children in this part of the developing world are mostly neglected and have questionable assess to ocular hygiene. This makes them more prone to ocular infections. The present study aims to throw a light on the microbiological pattern of conjunctival flora of street children in comparison to normal children with the antibiotic sensitivity pattern of both the groups.

II. Methodology

157 street children were included in the study as compared to 143 children with no presenting symptoms for ocular infections who reported to OPD in Regional Institute of Ophthalmology Kolkata during the study period from May 2015 to April 2016. In both the groups children were selected after simple random sampling using the random number table. Children with active signs and symptoms of ocular infection or inflammation, children with recent or remote history of ocular infections or inflammation or trauma, children with systemic ailments, children with history of topical or systemic antibiotics within last 1 week of inclusion date, children with chemical injury to eye and children whose parents did not give valid consent were excluded from the study. Samples of conjunctival fluid were collected from inner canthus of both eyes of all children in both the groups with the help of a sterile cotton swab. The collected samples were sent to the microbiological laboratory after inoculation in appropriate transport media. Rigorous Cold chain was maintained during the transport. The organisms obtained were isolatedafter inoculation in appropriate culture media and observed under the microscope. Further, biochemical characterization of the isolated organisms was done. The antibiotic sensitivity pattern of the organisms was also investigated as per protocol. The obtained results were analyzed using standard statistical procedures.

III. Results and Analysis

Among the street children about 69.45% were males as compared to 65.03% among the control population (p=0.14, Chi square: 2.18). The mean age of the Street Children were 6.3±1.5 years as compared 6.5±1.3 years among the control population(p=0.13). Hence both the Street Children and the Control population were age and sex matched. According to Kuppuswamy Socio Economic scale, 96.81% of the Street Children belonged to LOWER socio economic class as compared to 60.12% among the control population. The difference was highly statistically significant (P<0.00,Chi Square: 55.24). Staphylococcus Aureus was the most common organism isolated among the both the groups (49.23% versus 29.21%). However the distribution was highly significant (P<0.00 chi Square:23.48). The next most common organism isolated among both the Street Children and the control population was Staphylococcus Epidermidis followed by Pseudomonas Species. However the distribution was not skewed (P=0.42 chi Square:0.65; P=0.37 chi Square:0.78). The distribution of Streptococcus Viridens among the two groups were highly skewed (7.65% versus 22.34%; P<0.00 chi Square:17.78). Among the 157 Street Children included in the study 327 organisms were isolated as compared to 291 isolates from 143 control population children. 71.98% of the Street Children were found to have Multiple micro-organisms isolated from their Conjunctival Cul-de –sac as compared to only 37.06% among the control population. The distribution is highly significant (p,0.00, Chi Sqaure: 49.05). While analyzing the drug sensitivity pattern among the isolated micro-organisms it was found that, the proportion of isolates resistant to fluroquinolones among the Street Children were much less that amongst the control population (Ciprofloxacin: P<0.00 chi Square:16.61, Moxifloxacin: P<0.00 chi Square:85.78, Gatifloxacin: P<0.00 chi Square:81.45, Besifloxacin: P<0.00 chi Square:13.00). However, the distribution of Tobramycin and Chloramphenicol resistance were comparable among the two groups (Tobramycin: P=0.22 chi Square:1.5, Chloramphenicol: P=0.06 chi Square:3.43).

IV. Discussion

The present study demonstrates without any ambiguity that the profile of micro-organisms isolated from the conjunctiva of street children was same as compared to children in the control group. However, due to lack of proper ocular hygiene and compromised living standards, more number of street children was found to have been harboring bacteria in their conjunctival cul de sac. More number of street children was found to have multiple bacterial isolates as compared to the control population.

The most common micro-organism isolated from the conjunctiva of the study population was Staphylococcus Aureus followed by Staphylococcus Epidermidis, Pseudomonas Species and Streptococcus Viridens. In a study conducted in Andhra Pradesh, South India, among patients scheduled to undergo cataract surgery by Karthika N et al, the most common isolate was Staphylococcus Epidermidis followed by Diphtheroids[7]. The difference in the nature of isolates between the two studies is probably due to the difference in age group and geographic location. However in a study conducted in China among pediatric populationby Zhang M et al, Staphylococcus and Streptococcus were found to be the most frequent cause of Endophthalmitis in the pediatric population[5]. In another study conducted in Karnataka, South India by Prakash R et al, the most common isolates from conjunctiva of patients suffering from Chronic Dacryocystitis was Staphylococcus Auerus, Streptococcus Pneuminae and Pseudomonas Aeruginosa[6]. The conglomeration of the same micro organism in Chronic Dacryocystitis patients and normal children may reflect the proneness of the study population towards infective pathologies concerning the Lacrimal Drainage Apparatus and other ocular adnexal structures. The differences in the age group between the study population of the two studies is yet another fact which needs to be considered.

One interesting fact coming out from the present study is the statistically more number of Fluoroquinolone resistance among the control population than the Street Children. However, the distribution of Tobramycin and Chloramphenicol resistance was comparable among the two groups. This can be attributed to the fact that control population children have easier and frequent access to Out Patient Department than the street Children and irrational use of topical fluoroquinolones among the control population is promoting drug resistance. This claim may be debatable and needs further scientific analysis and clarification.

V. Conclusion

The microbiological flora of any biological surface varies with age group, geographic location, living conditions, ethnicity and many more factors. Comprehensive Knowledge regarding the micro organisms in the ocular surface of pediatric age group in Eastern India may aid in the management of ocular infections in future. Street Children are socially neglected with limited access to medical facilities. Poor personal hygiene, lack of sanitation and compromised living conditions make them highly suitable to act as appoint source in cases of epidemic outbreak of infections. The present study is a small step towards documenting the microbiological profile of ocular surface of Street Children. This needs to be followed up with a multicentre community based study of the prevalence of ocular infective pathologies among street children in different cities in Eastern India.

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Charts and Figures

Table 1: Showing the distribution of the Study Population according to Kuppuswamy Socio-economic Scale:

Kuppuswamy Socio-economic Class	Street Children (N=157)	Control Population (n=143)	P Value
UPPER	0(0.00%)	2(1.43%)	P<0.00 Chi Square: 55.24
UPPER MIDDLE	0(0.00%)	4(2.79%)	
LOWER MIDDLE	0(0.00%)	12(8.39%)	
UPPER LOWER	5(3.19%)	39(27.27%)	
LOWER	152(96.81%)	86(60.12%)	

Table 2: Showing the distribution of Micro organisms isolated from the conjunctival Cul-de-sac among the study Population:

Organism	Street Children (N=327)	Control Population (n=291)	P Value
Stapphylococcus Aureus	161(49.23%)	85(29.21%)	P<0.00 chi Square:23.48
Staphylococcus Epidermidis	82(25.08%)	72(24.74%)	P=0.42 chi Square:0.65
Pseudomonas Species	59(18.04%)	69(23.71%)	P=0.37 chi Square:0.78
Streptococcus Viridens	25(7.65%)	65(22.34%)	P<0.00 chi Square:17.78

**** Total number of Positive Isolates among the Street Children were 327 and that among the control population was 291**

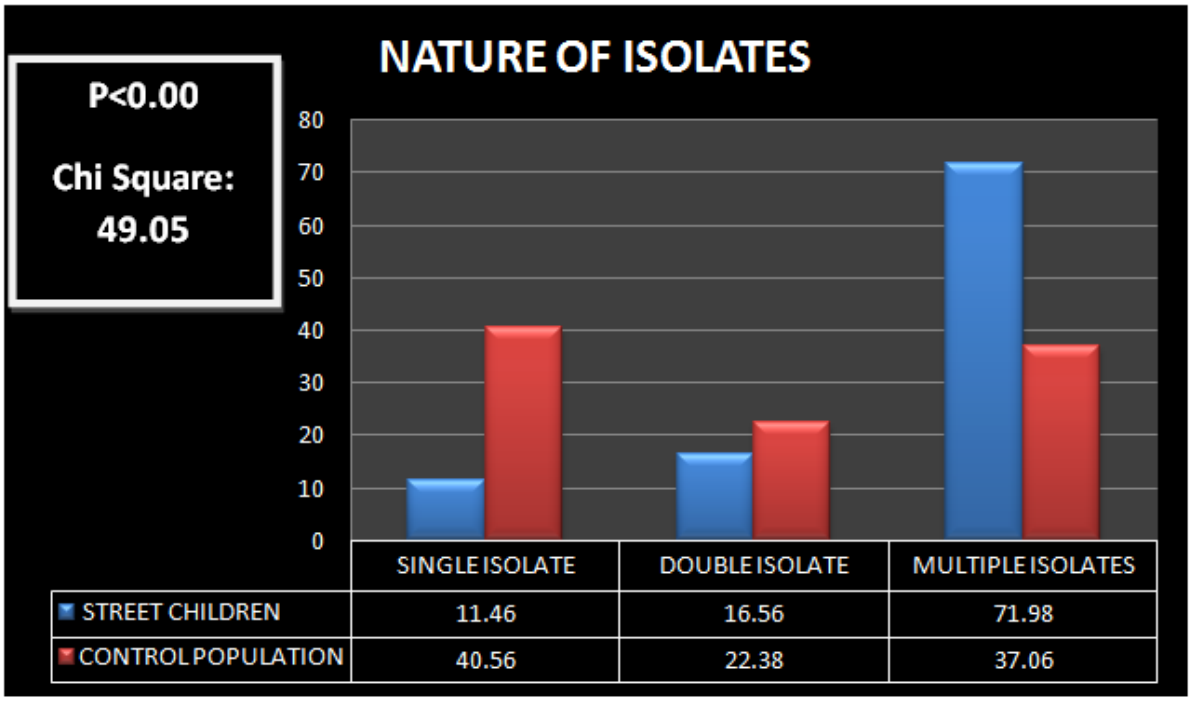
Table 3: Showing the pattern of Topical Antibiotic sensitivity among the study population:

Resistant Drugs	Street Children (N=327)	Control Population (n=291)	P Value
CIPROFLOXACIN	120(36.70%)	192(65.98%)	P<0.00 chi Square:16.61
MOXIFLOXACIN	42(12.84%)	180(61.85%)	P<0.00 chi Square:85.78
GATIFLOXACIN	21(6.42%)	133(45.70%)	P<0.00 chi Square:81.45
BESIFLOXACIN	00(0.00%)	13(4.47%)	P<0.00 chi Square:13.00
TOBRAMYCIN	42(12.84%)	54(18.56%)	P=0.22 chi Square:1.5

CHLORAMPHENICOL	15(4.59%)	27(9.29%)	P=0.06 chi Square:3.43

**** Total number of Positive Isolates among the Street Children were 327 and that among the control population was 291**

Figure 1: Showing the Distribution of the Nature of Conjunctival Isolates among the study population:



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