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PREVALENCE OF PYOGENIC MENINGITIS IN A TERTIARY CARE HOSPITAL OF SINDH.

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ABSTRACT… Objectives: The current study aimed to find out the prevalence of pyogenic meningitis in the local population of Peoples University of Medical and Health Sciences Hospital Nawabshah. **Study Design:** Descriptive Cross Sectional study. **Setting:** Pediatric Ward of People University of Medical and Health Sciences Hospital, Nawabshah. **Period:** 1 year from November 2018 to October 2019. **Material & Methods:** Using self-designed questionnaire. Patient's samples were send for relevant investigations i.e. Blood culture and CSF examination and their results were recorded in proforma. Statistical Package for Social Science (SPSS) version 21 was used for data analysis. **Results:** Mean age of the children was 7 Years with a standard deviation of 2.4 years. 57% of the sample consist of boys while 43% were girls. Diagnosis of pyogenic meningitis was confirmed in 52.08% of the cases and fever was present in 100% cases and was the most common clinical presentation followed by headache (67%), Vomiting (44%) and fits (28%). Mean protein level was 235 mg/dl in the diagnosed cases. Mean sugar level in CSF of diseased children was 35 mg/dl with significant p-value of 0.0005. **Conclusion:** Pyogenic meningitis is highly prevalent that is 52.08% in current study. Its morbidity and mortality can be reduced by early recognition and prompt treatment.

Key words: Fever, Meningitis, Pyogenic Meningitis.

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INTRODUCTION

Meningitis is a medical term used for inflammation of meninges (outer covering) of human brain. This inflammation can due to multiple causes i.e. bacteria, virus or fungal infection. When this infection is caused by a bacteria it is known as pyogenic or bacterial meningitis.[1] Group B Streptococcus, E. coli, streptococcus pneumoniae, H. Influenza & Listeria monocytogens are most widespread causes of pyogenic meningitis in neonates, while Streptococcus pneumoniae and Neisseria meningitides are the two most widespread organisms causing pyogenic meningitis in children.[2-4] Common clinical presentation of patient comprises of high grade fever, headache, neck stiffness, nausea, vomiting, muscle pain and confusion.[5] Detection of pyogenic meningitis is made clinically on presentation and relevant examination and is confirmed by Cerebo-spinal fluid analysis and blood culture.[6]

Pyogenic Meningitis occur in two most common patterns, with instant onset and progression to shock, disseminated intravascular coagulation, altered consciousness, purpura ad death or with non-specific symptoms progressing to irritation of meninges, elevated intra-cranial pressure and seizures.[7] The complications are developmental delay, epilepsy, mental retardation, spasticity, hearing problem, visual problem, speech problem and behavioral disorders.[8] Bad prognostic signs includes, age at onset of illness less than 6 months, episodes of seizures, acute complications like coma, focal neurological signs and low CSF glucose.[9]

Pyogenic Meningitis is an alarming condition related to increase in mortality and morbidity.[10] Bacterial meningitis was considered as an epidemic and causes death of 70% of population effected by it before invention of antibiotic as a cure in 1940. Antibiotics have reduced the mortality rate up to 25% but this rate has been static since last 25 years and no further reduction

have been observed.[11] Pyogenic Meningitis can effect individuals of every age but it is most common in infancy and old age.[12] A study conducted in India found that 78% of the total cases of pyogenic meningitis belonged to age group less than 1 year,[13] while a similar study in Pakistan showed that 53% of effected children's belonged to children age group 2 months to 2 years.[14] The aim of the current study was to find out the prevalence of pyogenic meningitis in the local population of Peoples University of Medical and Health Sciences Hospital Nawabshah, a tertiary care hospital of Sindh.

MATERIAL & METHODS

A descriptive cross sectional study designed was selected for this study. Consecutive sampling technique was used. Sample size was calculated using Rao software by using the prevalence of 53.33% from a previous study[14] at 95% confidence interval and 5% margin of error and was found to be 90. Data was collected for 1 year from November 2018 to October 2019.

Patients coming to pediatric ward of People University of Medical and health sciences Hospital, Nawabshah were recruited for study. All patients reporting with cardinal fever, headache, vomiting and fits, irrespective of gender and age <14years diagnosed on basis of clinical presentation and laboratory investigations were include in the current study. Patients of more than 14 year of age, who refused to give consent or with history of cerebral palsy, congenital heart disease and deafness were excluded from the study.

A self-designed questionnaire was used which was validated on a sample of 10 patients. Written informed consent was obtained from the patient's relative or next of kin. After taking detailed history and relevant clinical examination, patient's samples were send for relevant investigations i.e. Blood culture and CSF examination and their results were recorded in questionnaire.

Statistical Package for Social Science (SPSS) version 21 was used for data analysis. Mean and standard deviation was calculated for quantitative variable, Frequency and percentages was computed for qualitative variables. Effect modifier like gender and age, clinical presentation was controlled by stratification, Mann Whitney U test and chi-square test was applied to find associations. P-value of 0.05 was taken as significant.

RESULTS

There were 96 children associated with high grade fever and fits, diagnosed on basis of clinical presentation and laboratory investigations were include this study. Children was divided into three sub-groups on the basis of their age 33% (n=32) children were under the age of five, 36% (n=35) were aged between 6 to 8 years while 30% (n=29) belong to age group 9 to 12 years. Mean age of the children was 7 Years with a standard deviation of 2.4 years. 57% of the sample consist of boys while 43% were girls. Diagnosis of pyogenic meningitis was confirmed in 52.08% (n=50) of the cases and fever was present in 100% cases and was the most common clinical presentation followed by headache (67%), Vomiting (44%) and fits (28%). The basic demographic information, symptoms and their association with disease is shown in Table-I.

Variable	Pyogenic Meningitis		P-Value
	Yes	No	
Age Groups			
<5 Years	20	12	0.34
6-8 Years	16	19	
9-12 Years	14	15	
Gender			
Male	31	24	0.33
Female	19	22	
Symptoms			
Fever	50	46	0.002
Headache	47	20	0.005
Vomiting	22	22	0.707
Fits	16	12	0.405

Table-I. Basic Demographic and symptoms and their association with pyogenic meningitis.

Basic CSF biochemical parameters were correlated with the diagnosis of meningitis as shown in Figure-1. Mean protein level was 235

mg/dl in the diagnosed cases while it was 35 mg/dl as compared with other non-diseased children, very significant p value of 0.0005 was obtained and show association. Mean sugar level in CSF of diseased children was 35 mg/dl while in non-diseased children it was 60 mg/dl, it also shows very high significance with disease with a p value of 0.0005. WBC level in CSF of diseases children was 136 $X10^2$ while in non-diseased children was 80 $X10^2$, p-value of 0.0005 was found when calculated and show very high significance with disease.

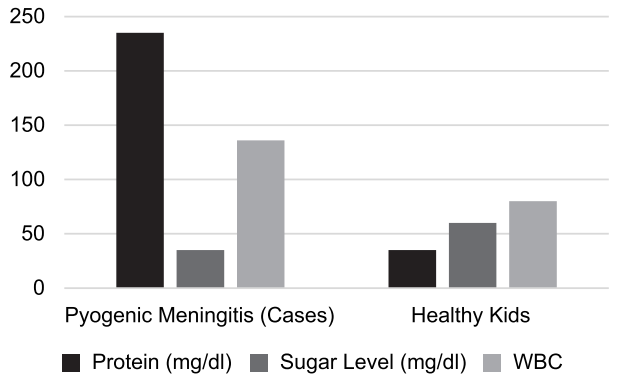

Figure-1. CSF Biochemical parameters and their levels in pyogenic meningitis.

DISCUSSION

Three percent of all hospitalizations are because of Pyogenic Meningitis. Developing countries have a higher incidence of Pyogenic Meningitis. High risk of morbidity and mortality and the risk of acute complications is correlated with pyogenic meningitis. This condition has 8-20 percent mortality, 50 percent neurobehavioral morbidity while relapse rate is 3-4 percent. Neurodevelopmental sequelae may occur in 10-20 percent of the cases. Although, the entire population is susceptible to Pyogenic Meningitis but is most common between one month to one year of age.[15] At current tertiary care hospital, the average age of the patients was 7.09±2.44 years. A similar research from India revealed that 78% of children from 1 year up to 10 years of age were affected by meningitis. On the other hand, Asghar et.al found that children between 2 months and 2 years of age were affected in 53.3% of cases.[16] This shows that meningitis is more common in young age group. In current study, prevalence of pyogenic meningitis in children was observed in 52.08% cases. Similar result was also reported in a local study which revealed 53.33 % cases were pyogenic meningitis found 2 months to 2 years. In Joardar et.al study 34.66% were pyogenic according to causative agents.[17]

Another survey in India showed that there is increased prevalence of Pyogenic meningitis in males as compared to females.[18] A similar survey was carried out in Nigeria[19] which showed that males are affected in 70% of cases whereas females are affected in 30% of cases while current study reported 57.29% were male and 42.71% were female. These results are consistent with previous researches. The classical clinical presentation including pyrexia, convulsions, unconsciousness, vomiting and fatigue. In current study, the typical manifestation of pyogenic meningitis was pyrexia followed by headache, vomiting and fits. These results were analogous to that in India[18] and Nigeria.[19]

Complications involving the CNS are very commonly associated with pyogenic meningitis like deafness, mental retardation, developmental delay, aphasia, eyesight problems and motor deficit.[20] Bad prognosis is associated with age less than 6 months of age at onset of illness, fits after 4 days of medication, acute complications like coma and focal neurological signs, low CSF glucose and more than 106 CFU bacteria/ml in the CSF.[21] Pyogenic Meningitis gave rise to positive CSF culture in 40 to 60 % of patients. Between age 2 months and 12 years the most common cause is Streptococcus pneumoniae, followed by Neisseria meningitis and Haemophilus Influenzae. Before 18 months of age signs of meningeal irritation do not develop. Cranial nerve palsy and bulging fontanelle were found in 9 (30%) and 8 (26.7%) patients respectively while four (13.33%) patients had stroke and subdural effusion.[22]

CONCLUSION

Pyogenic meningitis is highly prevalent that is 52.08% in current study. It is more common in males than females. Morbidity and mortality of pyogenic meningitis can be reduced by early recognition and prompt treatment.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Habibullah Siyal	Conceived & designed the study, Conducted research.	
2	Asif Nadeem Jamali	Collected & analyzed the data.	
3	Zamir Ahmed Qambrani	Wrote initial & final draft of manuscript.	