Original Research Article

Clinical features as predictors of bacteraemia in febrile children

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Abstract

Objective: To determine the prevalence, clinical features and various risk factors of bacteraemia among hospitalized febrile children aged between 3 months to 36 months, in a tertiary care center. **Methods** A cross-sectional, non-interventional, observational study consisting of 88 cases were included in our study and evaluated for the determination of prevalence of bacteraemia and its clinical correlates. Clinical Examination was then carried out and temperature, weight, length, clinical state, respiratory rate, heart rate was recorded. Yale score was assessed at time of admission and recorded. It is composed of 6 clinical parameters i.e. Quality of cry, Reaction to parent, State variation, Colour, Hydration & Social response. **Results** Among these, blood culture was positive in 24 cases, while in 64 cases blood culture showed no growth of any pathogenic organism. Staphylococcus aureus was one of the most common pathogenic organism (25%) seen among febrile children. **Conclusion** Empiric antibiotic therapy must include anti-Staphylococcal antibiotic in our setting in a febrile child without apparent focus of infection. Vaccination has a definite protective role and incomplete vaccination status of a child can be regarded as a strong predictor of presence of bacteraemia.

Keywords: Prevalence, Bacteraemia ,Cross-Sectional, Non-Interventional, Observational Study.

Introduction

The present cross sectional study was done to determine the prevalence of bacteraemia and its correlation with risk factors in febrile children of 3 months to 36 months of age, in a tertiary care center, and to find whether 'simple clinical features can predict the bacteraemia in febrile children' for timely & effective management, even in a resource limited place. Bacteraemia (defined as presence of pathogenic bacteria in a blood culture), white blood cell count (WCC), McCarthy score, and final diagnosis based on clinical features and investigations

Fever in children is one of the most common manifestations of an illness, which makes the parents seek medical attention early. Fever occurs when various infectious and non-infectious processes interact with the host's defense mechanism. It is important that all children with fever are carefully assessed to find the cause. Nevertheless cause remains undetermined in a significant percentage of cases, leading to the designation of fever without focus (FWF) and fever of unknown origin (FUO). But even with the etiology being determined, fever remains the overriding source of anxiety[1].

20% of febrile children have fever without an apparent source of infection[2]. Among them a small proportion may have an occult bacterial infection, including bacteraemia, urinary tract infection (UTI), or, early meningitis. Febrile infants and young children traditionally, have been assigned to different management strategies by age groups: neonates (birth to 28 days), young infants (29 to 90 days), and older infants and young children (3 to 36 months).

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Infants younger than 3 months are often managed by using low-risk criterias, such as the Rochester Criteria or Philadelphia Criteria. The purpose of these criterias is to reduce the number of infants unnecessarily hospitalized and to identify infants who may be managed as outpatients by using clinical and laboratory criteria[3].

In children with fever without source (FWS). Occult bacteraemia occurs in approximately 3% of children younger than 3 years with fever without source FWS with a temperature of 39.0°C (102.2°F) or greater and in approximately 10% of children with FWS with a temperature of 39.5°C (103.1° F) or greater and a WBC count of 15, 000/mm^3 or greater[2]. The risk of a child with occult pneumococcal bacteraemia later having meningitis is approximately 3%. Bacteraemia is the presence of viable bacteria in the circulating blood[4]. Bacteraemia, usually indicates a serious infection and is often associated with severe morbidity and mortality[5] .When bacteraemia persists and is associated with toxic symptoms, the condition is often described as septicaemia[6]. By hematogenous spread bacteria can cause infection away from the original site of infection e.g. endocarditic, ostomyelitis. The source of fever may not be readily apparent on initial assessment. Bacteraemia may be a transient phenomenon with an affected child appearing ill during acute showering of bacteria, or it may be asymptomatic with destruction of bacteria and clearing by the reticulo-endothelial system. The evaluation of fever in this age group has great clinical importance, as any of the serious bacterial infections whose presence it may signal may have grave morbidity if not treated. However, very less work has been done to determine the risk of bacteraemia among young febrile children of 3 month – 36 month age in developing countries. Also what can be the simple clinical findings and presenting complaints which could identify child with bacteraemia.

In this cross sectional study we determine the prevalence of bacteraemia in a tertiary care center and associated risk factors in

febrile children aged 3-36 month, and determine whether simple clinical parameters could predict the bacteraemia in a febrile child.

Materials and methods

Study design
A cross-sectional, non-interventional, observational study.

Study area
Department of Pediatrics, Choithram Hospital & Research Centre, Indore

Study period
January 2016 - May 2016

Study population
All the children aged 3–36 months admitted in the pediatric department of Choithram Hospital & Research Centre, Indore (M.P.)To ensure adequacy of samples, P was taken 0.035 as bacteraemia prevalence was found 3.5% based on literature reviews[12], Q is 1-P (0.965), C=0.05

Study intervention
None.

Inclusion criteria
i. All the children aged between 3-36 months.
ii. Children who presented with fever i.e. rectal temperature >38°C (100.4°F), whose blood for culture & sensitivity were sent after admission in Pediatric Department.
iii. Parents of the children willing to provide their voluntary written informed consent for participation in the study.

Exclusion criteria
i. Child on some immunosuppressive drugs like steroids therapy.
ii. Children having chronic, recurrent or prolonged duration of fever (> 7 days), chronic illness like Leukaemia or other causes of immunodeficiency.
iii. Parents of the children not willing to provide their voluntary written informed consent form for participation in the study.

Child having chronic illness with prolonged duration of fever or having any immunodeficiency disorders were excluded, for the purpose of determining the acute causes and associated clinical features correlations.

Sample and sampling technique
All the children aged between 3-36 months presenting with fever (>38^0 C), admitted in pediatric department satisfying the inclusion and exclusion criterias, during the study period and who are willing to participate in the study were taken as study subjects. For the present study convenient continuous sampling technique was used.

Tools of data collection
The study was conducted after obtaining clearance from the Institutional Ethics Committee. On admission of the child in Department of Pediatrics, Choithram Hospital & Research Centre, Indore, parents were informed about purpose of study and a valid, written, informed consent from parents was obtained before interviewing as per the consent form

After establishing the initial rapport and explaining the purpose of study, and the presenting complaints with duration were recorded from the care giver of the child as per customized clinical proforma . Rectal temperature was noted with digital thermometer (fever is defined as rectal temperature ≥ 38°C or 100.4°F).

Clinical Examination was then carried out and temperature, weight, length, clinical state, respiratory rate, heart rate was recorded. Yale score was assessed at time of admission and recorded. It is composed of 6 clinical parameters i.e. Quality of cry, Reaction to parent, State variation, Colour, Hydration & Social response.The blood specimen collected was labelled appropriately and sent for analysis.

Culture & sensitivity
Specimens flagged positive by the system were sub- cultured onto blood agar, MacConkey agar, and chocolate agar. Isolation and identification of pathogens were performed using the standard bacteriologic procedure. Antimicrobial susceptibility testing was performed with Mueller-Hinton agar plates, using a disc diffusion method.

Observation chart

Table 1:Age distribution among patients

(N=88)

Age in months	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
3- 12 months	13	54.2	43	67.2	56	63.6
>12 to 24 months	06	25.0	15	23.4	21	23.9
>24 to 36 months	5	20.8	06	9.4	11	12.5
Total	24	100	64	100	88	100

The mean age of patients was found to be 11.88 months. No association could be found between age in months and presence / absence of bacteraemia (P>0.05).

Table 2: Sex distribution

Gender	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Male	15	62.5	49	76.6	64	72.7
Female	9	37.5	15	23.4	24	27.3
Total	24	100	64	100	88	100

Out of 88 patients 64 (72.7%) were male and 24 (27.3%) were female. In bacteraemic group there were 15 (62.5%) male and 9 (37.5%) females. In non- bacteraemic group there were 49 (76.6%) were male and 15 (23.4%) were females. There was no association between gender and presence/absence of bacteraemia (P>0.05).

Table 3: Vaccination status

Vaccination status	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Incomplete vaccination	12	50.0	8	12.5	20	22.7
Complete vaccination*	12	50.0	56	87.5	68	77.3
Total	24	100	64	100	88	100

χ2 value = 13.976, df=1, P value = 0.000185, Significant Overall 22.7% of the study population was not completely vaccinated, while the rest of them were completely vaccinated.Statistically significant association was seen between vaccination status and presence/absence of bacteraemia (P<0.05).

Table 4:Improper feeding pattern among patients

Improper Feeding pattern	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Present	9	37.5	21	32.8	30	34.1
Absent	15	62.5	43	67.2	58	65.9
Total	24	100	64	100	88	100

χ2 value = 0.171, df=1, P value = 0.679, Not Significant No association could be established between improper feeding pattern and presence/absence of bacteraemia (P>0.05).

Table 5: Exclusive breast feeding among patients aged between 3-6 months
(N=42)

Exclusive Breastfeeding	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Present	5	45.45	24	77.42	29	69.05
Absent	6	54.55	7	22.58	13	30.95
Total	11	100	31	100	42	100

χ2 value = 3.881, df=1, P value = 0.04880, Significant Significant association was established between the presence/absence of bacteraemia and exclusive breastfeeding (P < 0.05).

Table 6: Distribution of low weight for age (underweight)

Low Weight for Age	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Present	19	79.2	34	53.1	53	60.2
Absent	5	20.8	30	46.9	35	39.8
Total	24	100	64	100	88	100

χ2 value = 4.942, df=1, P value = 0.026, Significant Statistically significant association was seen between low weight for age (underweight) and presence/absence of bacteraemia in the study population (P<0.05).

Table 7: Distribution of duration of fever among bacteraemic and non-bacteraemic patients
(N=88)

Duration of Fever	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
≤ 4 days	13	54.2	45	70.3	58	65.9
> 4 days	11	45.8	19	29.7	30	34.1
Total	24	100	64	100	88	100

χ2 value = 2.025, df=1, P value = 0.154, Non Significant No significant association could be established between duration of fever and presence/absence of bacteraemia (P > 0.05).

Table 8: Distribution of "not accepting feed well" as a presenting complaint among bacteraemic and non bacteraemic patients
(N=88)

Not Accepting Feed Well	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Present	7	29.2	4	6.2	11	12.5
Absent	17	70.8	60	93.8	77	87.5
Total	24	100	64	100	88	100

χ2 value = 8.381, df=1, P value = 0.0037, Significant Statistically significant association was established between not accepting feed well and presence/absence of bacteraemia (P < 0.05).

Table 9: Distribution of palpable organomegaly among bacteraemic and non-bacteraemic patients
(N=88)

Palpable Organomegaly	Bacteraemia Yes		Bacteraemia No		Total	
	N	%	N	%	N	%
Present	11	45.8	12	18.7	23	24.1
Absent	13	54.2	52	81.3	65	73.9
Total	24	100	64	100	88	100

χ2 value = 6.631, df=1, P value = 0.010, Significant

Table. 10 Presenting signs and symptoms of febrile bacteraemic patients

S. No	Sign / symptoms	Number	% presentation among bacteraemic (n=24)	% presentation 3-12 month (n=13)	% presentation >12-24 months (n=5)	% presentation >24-36 months (n=6)
1.	Cough / cold	10	41.66%	6(46.15%)	1(20%)	3(50%)
2.	Convulsion	9	37.50%	5(38.46%)	3(60%)	1(16.66%)
3.	Restlessness/	9	37.50%	4(30.76%)	2(40%)	3(50%)

	fidgety behaviour					
4.	↑ R.R. / Chest retraction	7	29.16%	4(30.76%)	0	3(50%)
5.	Not accepting feed	7	29.16%	6(46.15%)	0	1(16.66%)
6.	Loose stools	7	29.16%	3(23.07%)	3(60%)	1(16.66%)
7.	Dehydration	7	29.16%	2(15.38%)	3(60%)	2(33.33%)
8.	Vomiting	4	16.66%	1(7.69%)	2(40%)	1(16.66%)

Results

- In the present study prevalence of bacteraemia in 3 – 36 month febrile children hospitalized in a tertiary care center, in a developing country was found to be 27.2%.
- Spectrum of bacterial pathogenic organisms isolated in our study were-Staphylococcus aureus was the most common organism isolated (25%) of all positive blood cultures.
- Majority of the febrile cases (63.60%) belonged to age group 3-12 months. The mean age found among bacteraemic cases was 13 months. The correlation between age and their susceptibility for presence of bacteraemia was found non significant.
- In the present study, among all incompletely vaccinated children 60% had bacteraemia while in children who were fully vaccinated, only 17.6% children had developed bacteraemia and 82.35% were protected.
- Exclusive breast feeding practice is found to be protective against risk of bacteraemia (p value=0.048). Children who were exclusively breast fed till 6 months of life were found almost 3 times less prone to develop bacteraemia versus non breast fed ones (17.2% vs 46.15%).
- Correlation of various indices of malnutrition with presence of bacteraemia revealed that among bacteraemic group 58.33% patients had wasting (low weight for height), 79.20% were underweight (low weight for age) and 54.20% were stunted (low height for age). All the indices of malnutrition were found strongly associated (p<0.05) with presence of bacteraemia.
- Various clinical features by which a child presents to clinician were studied for its correlation. We found that among bacteraemic group, 29.16% of patient's attender complaint of child not accepting feed well, 37.50% children presented with the restlessness and 45.83% patient had abnormal palpable organomegaly on clinical examination at the time of presentation. These all found significantly associated with presence of bacteraemia.

Statistical analysis

Data was tabulated on Microsoft Excel sheet and was analyzed using the SPSS software for Windows. Pearson's Chi-square test was used for finding the association between the two non-parametric variables. For comparing the mean of various variables between the bacteraemic and non-bacteraemic groups, students unpaired 't' test was applied. A p value of < 0.05, was considered as statistically significant. The final data was represented in form of tables, bar diagrams, pie charts where ever necessary.

Discussion

The present study '"**To determine the prevalence of bacteraemia and its risk factors in febrile children 3 months to 36 months of age, in a tertiary care center and to find whether 'simple clinical features and lab parameters can predict the bacteraemia in febrile children**'" was conducted in the department of Pediatrics, Choithram Hospital & Research center, Indore.

Total 698 number of patients of all age groups, were admitted in the study period from Jan – May 2016 in our pediatric department. Among them 107 cases were from 3- 36 months who presented with fever. 19 cases were excluded on the basis of chronic disease, being on immunosuppression therapy or had prolonged pyrexia. So, 88 cases were included in our study and evaluated for the determination of prevalence of bacteraemia and its clinical correlates. Among these, blood culture was positive in 24 cases, while in 64 cases blood culture showed no growth of any pathogenic organism.

Haddon RA et al did a prospective observational case study bacteraemia in febrile children presenting to a paediatric emergency department. Patients aged 3-36 months presenting to the Emergency Department with temperature 3= 39°C and without specific viral illnesses (varicella, croup or herpes gingivostomatitis).. Bacteraemia was identified in 18 of 534 patients (3.4%). Pathogens isolated were Streptococcus pneumoniae [15], Neisseria meningitidis [2] and Klebsiella pneumoniae [1]. Increased WCC counts (P<0.001) and brief duration of fever (P< 0.001) were associated with bacteraemia. Nevertheless, clinical features, including McCarthy scores, and high WCC counts (>20times10^9/L) had <10% predictive accuracy for bacteraemia. Neither clinical features nor high WCC counts reliably identify these patients. As empiric antibiotics may contribute to increasing antibiotic resistance and have not been shown to prevent the rare complication of meningitis, we believe that close contact and regular review of these patients is preferable to empiric antibiotic therapy[1].

Fever is a common complaint in infancy, and bacteraemia is one of the more serious causes of such fever. However, there exists scanty data on risk of bacteraemia among febrile infants of developing countries and what clinical predictors, if any, could identify those febrile infants with bacteraemia. To address this issue, Ayoola OO et al studied 102 infants aged 1-12 month(s) attending the Children's Emergency Ward of University College Hospital, Ibadan, Nigeria, with rectal temperatures of ≥38 °C and with a negative history of antimicrobial use for at least one week prior to presentation. Infants, meeting the eligibility criteria of the study, underwent a full clinical evaluation and had blood cultures done for aerobic organisms by standard methods. Over 38% of the infants had bacteraemia. Escherichia coli (35.9%), Staphylococcus aureus (33.3%), and Klebsiella spp. (10.3%) of positive cultures were commonly isolated. It is concluded that; in the setting of the study, about 4 in 10 febrile infants would have a positive blood culture for aerobic organisms and that age of ≤6 months, restlessness, and a white cell count of ≥15,000/mm3 are associated with a significantly increased risk of bacteraemia. Clinicians practising in such a setting need to be aware of the increased risk of bacteraemia in infants with these clinical features[2].

A study similar to ours was done by Isaacman DJ et al in febrile children 3 to 36 months of age with a purpose to develop an improved model for the prediction of bacteremia in young febrile children. Clinical and laboratory parameters reviewed included age, gender, race, weight, temperature, presence of focal bacterial infection, white blood cell count (WBC), polymorphonuclear cell count (PMN), band count, and absolute neutrophil count (ANC). Predictors of bacteremia identified by logistic regression included ANC, WBC, PMN, temperature, and gender. Receiver operator characteristic (ROC) analysis showed similar performance of ANC and WBC as predictors of bacteremia. A logistic regression formula was developed that could be used to develop a unique risk value for each patient based on temperature, gender, and ANC.Use of the formulas derived here allows the clinician to estimate a child's risk for bacteremia based on temperature, ANC, and gender. This approach offers a useful alternative to predictions based on fever and WBC alone. bacteremia, detection, white blood cell[3].

Kuppermann N et al did similar study on predictors of occult pneumococcal bacteremia in young febrile children.Patients with OPB were younger, more frequently ill-appearing, and had higher

temperatures, WBC, ANC, and ABC than patients without bacteremia. Only three variables, however, retained statistically significant associations with OPB in the multivariate analysis. Independent predictors of OPB in children 3 to 36 months of age with temperatures of 39° C or higher treated as outpatients include ANC, temperature, and age younger than 2 years. These predictors may be used to develop clinical strategies to limit laboratory testing and antibiotic administration to those children at greatest risk of OPB[4].

Bacteremia is an important cause of death and complications in children with sickle cell disease (SCD), yet predictors of bacteremia in these patients have not been well identified. West DC et al worked on predictors of bacteremia in febrile children with sickle cell disease. The purpose of this study was to test whether clinical and hematologic variables commonly used to predict bacteremia in normal young children with fever could accurately predict bacteremia in febrile children with SCD. here were 175 evaluable febrile events, of which 8 (4.6%) were associated with bacteremia. In the multivariate analyses, all hematologic variables, but not age or height of fever, retained significant associations with bacteremia.In febrile children with SCD, WBC, ANC, and ABC are all independently associated with bacteremia when adjusting for height of fever and age. Hematologic variables may be useful in developing prediction algorithms to identify febrile patients with SCD at higher risk of bacteremia. These data emphasize the need for a national trial to develop a predictive model with defined thresholds[5].

Crain EF et al did similar study on febrile infants.All infants were admitted for parenteral antibiotic therapy pending culture results. Culture-positive bacterial infections occurred in 6.3% (n=11); the incidence of bacteremia was 3.4% (n=6). Of special concern were the 134 infants who had no visible source for their fever during the first examination. A major goal was to determine whether there were any early predictors of bacteremia in this group. An erythrocyte sedimentation rate ≥30 and the examiner's impression of sepsis were significantly associated with bacteremia but did not correctly identify all cases. However, the combination of impression of sepsis, white blood count ≥15,000/mm^3, and erythrocyte sedimentation rate ≥30 identified all infants with bacteremia and excluded 82% of the infants who were eventually shown not to have bacteremia[6].

Craig JC et al did a prospective cohort study on the accuracy of clinical symptoms and signs for the diagnosis of serious bacterial infection in young febrile children .Diagnosis of one of three key types of serious bacterial infection (urinary tract infection, pneumonia, and bacteraemia), and the accuracy of both our clinical decision making model and clinician judgment in making these diagnoses. On the basis of the data from the clinical evaluations and the confirmed diagnosis, a diagnostic model was developed using multinomial logistic regression methods. Physicians' diagnoses of bacterial infection had low sensitivity (10-50%) and high specificity (90-100%), whereas the clinical diagnostic model provided a broad range of values for sensitivity and specificity.Emergency department physicians tend to underestimate the likelihood of serious bacterial infection in young children with fever, leading to undertreatment with antibiotics. A clinical diagnostic model could improve decision making by increasing sensitivity for detecting serious bacterial infection, thereby improving early treatment[7].

Kuppermann N et al did another study on occult bacteremia in young febrile children. The evaluation of nontoxic-appearing young (i.e., < 3 y of age) febrile children is a subject of considerable debate. Occult bacteremia in young febrile children is at the center of the controversy.One factor that will alter the controversy, however, is the imminent availability of a conjugate pneumococcal vaccine. The introduction of this vaccine will significantly decrease the prevalence of invasive pneumococcal disease, including occult bacteremia, caused by vaccine serotypes in fully immunized children. Therefore, despite the eventuality of a conjugate pneumococcal vaccine, knowledge of the data regarding occult bacteremia continues to be of importance to clinicians caring for young children[8].

Yilmaz HL et al evaluated screening tools for bacteraemia in a selected population of febrile children. There is no single reliable predictor of SBI(serious bacterial infections) in infants. This review examines some of the recent work evaluating the usefulness of indicators for SBI, such as white blood cell count (WBC), C-reactive protein (CRP), procalcitonin (PCT), and interleukin-6 (IL-6).Much progress has been made in recent years in finding more accurate indicators of SBI than WBC. However, while recent developments have given clinicians some new tools in evaluating febrile infants and children, it remains a formidable undertaking. In the especially vulnerable infant population, the holy grail of a single ideal SBI indicator remains elusive[9].

Bang A et al studied Yale Observation Scale for prediction of bacteremia in febrile children. Nijman RG et al gave a clinical prediction model to aid emergency doctors managing febrile children at risk of serious bacterial infections. In a rospective observational diagnostic study a prediction model was constructed using multivariable polytomous logistic regression analysis and included the predefined predictor variables age, duration of fever, tachycardia, temperature, tachypnoea, ill appearance, chest wall retractions, prolonged capillary refill time (>3 seconds), oxygen saturation <94%, and C reactive protein. A validated prediction model, including clinical signs, symptoms, and C reactive protein level, was useful for estimating the likelihood of pneumonia and other SBIs in children with fever, such as septicaemia/meningitis and urinary tract infections[10,11].

Van den Bruel A did a systematic review showing diagnostic value of clinical features at presentation to identify serious infection in children in developed countries .Their aim was to identify which clinical features have value in confirming or excluding the possibility of serious infection in children presenting to ambulatory care settings in developed countries.30 studies were included in the analysis. Cyanosis (positive likelihood ratio range 2·66–52·20), rapid breathing (1·26–9·78), poor peripheral perfusion (2·39–38·80), and petechial rash (6·18–83·70) were identified as red flags in several studies.The red flags for serious infection that were identified should be used routinely, but serious illness will still be missed without effective use of precautionary measures[12].

Practice guideline for the management of infants and children 0 to 36 months of age with fever without source was given by Baraff LJ et al in annals of emergency medicine. An expert panel of senior academic faculty with expertise in pediatrics and infectious diseases or emergency medicine.A comprehensive literature search was used to identify all publications pertinent to the management of the febrile child. All toxic-appearing infants and children and all febrile infants less than 28 days of age should be hospitalized for parenteral antibiotic therapy. Febrile infants 28 to 90 days of age defined at low risk by specific clinical and laboratory criteria may be managed as outpatients if close follow-up is assured. Older children with fever less than 39.0 C without source need no laboratory tests or antibiotics. Children 3 to 36 months of age with fever of 39.0 C or more and whose WBC count is 15,000/mm^3 or more should have a blood culture and be treated with antibiotics pending culture results. Urine cultures should be obtained from all boys 6 months of age or less and all girls 2 years of age or less who are treated with antibiotics[13].

Brent AJ et al did a community-based observational study on incidence of clinically significant bacteraemia in children who present to hospital in Kenya: community-based observational study. Estimates of the burden of invasive bacterial disease in sub-Saharan Africa have previously relied on selected groups of patients, such as inpatients; they are, therefore, probably underestimated, potentially hampering vaccine implementation. Their aim was to assess the incidence of bacteraemia in all children presenting to a hospital in Kenya, irrespective of clinical presentation or decision to admit. Clinically significant bacteraemia in children in Kilifi is twice as common, and pneumococcal bacteraemia four times as common, as previously estimated. Our data support the introduction of pneumococcal vaccine in sub-Saharan Africa[14].

In the present study prevalence of bacteraemia in 3 – 36 month febrile children hospitalized in a tertiary care center, in a developing country was found to be 27.2%.Spectrum of bacterial pathogenic organisms isolated in our study were-Staphylococcus aureus was the most common organism isolated (25%) of all positive blood cultures. Salmonella typhi was the second most common isolate found comprising of 16.67% of all bacteraemic cases. Other organisms on positive blood culture were Klebsiella pneumoniae, Citrobacter spp, E. coli, Streptcoccus Group D, Salmonella paratyphi A. and Pseudomonas aeruginosa.

In our study among bacteraemic group Male:Female ratio found was 1.66:1 (15:9), 70.8% cases were from Hindu community while rest from others. No statistical correlation was established.Various clinical features by which a child presents to clinician were studied for its correlation. We found that among bacteraemic group, 29.16% of patient's attender complaint of child not accepting feed well, 37.50% children presented with the restlessness and 45.83% patient had abnormal palpable organomegaly on clinical examination at the time of presentation. These all found significantly associated with presence of bacteraemia. Other clinical features which were taken into consideration but were found statistically non significant (p >0.05) were child presenting with excessive cry, breathlessness, vomiting and loose stools.

Conclusion

- The prevalence of bacteraemia (27.7% in our study) is still high in developing countries reasons being low socioeconomic status, poor vaccination coverage, malnutrition, poor sanitation etc.
- Staphylococcus aureus was one of the most common pathogenic organism (25%) seen among febrile children in a tertiary care hospital setting. These finding implies that empiric antibiotic therapy must include anti-Staphylococcal antibiotic in our setting in a febrile child without apparent focus of infection

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