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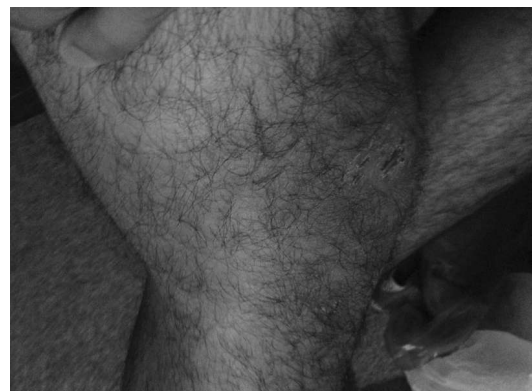
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Courtesy: Dr Samreen Sarfaraz, The Indus Hospital, Karachi.

## Role of mobile phone based communication to improve routine immunization coverage in Pakistani children

Pakistan is the major polio epidemic country and one of the few places requiring proof of polio vaccination for international travel.<sup>1</sup> Improved routine immunization (RI) coverage is recommended as the priority public health strategy, to reduce vaccine preventable diseases and eradicate polio in Pakistan and worldwide. With reemergence of polio in Nigeria, increase uptake of polio vaccine as part of RI program is the only defense to eliminate and sustain polio eradication. Unfortunately, routine childhood immunization (RI) in Pakistan is well below the recommended coverage of 90% with rates as low as 16% in Baluchistan province.<sup>2</sup>

Some of the major factors responsible for low RI coverage in Pakistan include low demand for immunization, lack of awareness and education, drop-outs and inability to complete the subsequent doses and overestimates of vaccination coverage. Hence, novel and cost effective strategies for enhancement in RI uptake should be explored. The mobile phone and text message use has increased dramatically with around 7 billion mobile phone subscribers globally. There are around 130 million mobile phone subscribers in Pakistan. There is also a surge in the use of short messaging service (SMS), with 237.58 billion person-to-person SMS generated in 2011 estimating to around 175 SMS per mobile phone on a monthly basis.<sup>3</sup>

Data from mobile phones and text messages has the potential to connect health care services to pregnant women and mothers bypassing different barriers.<sup>4</sup> Vaccine reminders-recalls and parental education using text messages have long been endorsed to increase uptake for routine childhood vaccines.<sup>5</sup> Automated SMS and voice calls on mobile phone can be delivered as continuum of care starting from early pregnancy, continuing through child birth, newborn and infancy. This might bring about the behavioral changes necessary to improve the RI uptake among children. SMS text in general has more audacity and can be easily automated and scaled up in national and global programs. In addition, free airtime or voucher as incentive can be added to the intervention if required, however its feasibility for scale up in the EPI program is questionable.

One major reservation for SMS based interventions is the level of literacy. Automated calls and interactive voice response technology are other strategies to address the barrier of low literacy. Although the cost of SMS is 6 times less than automated calls. In addition, playing a catchy jingle or ringtone on mobile phone networks can help in increasing awareness and significance regarding RI and its schedule. Another major advantage of mobile based communication is quick and cheap conversion of campaigns into different versions according to local environment and context. An automated voice call from a religious leader advocating RI can be broadcasted in a

conservative society, the same message recorded in celebrity voice can be disseminated in other settings.

In Pakistan SMS based messages have been used to send reminders to parents regarding vaccination and for monitoring of supplementary immunization activities.<sup>6</sup> We assessed the role of sending automated SMS messages to parents/ caregivers of children under five years of age to monitor polio supplementary immunization campaigns in polio endemic areas of Karachi.<sup>7</sup> The study reported positive outcomes in monitoring the polio immunization coverage at household level and could be used to highlight deficiencies in coverage. Similarly, another study evaluated the effectiveness of one way SMS reminder messages in improving RI coverage at weeks 6, 10 and 14. Although the results were not statistically significant, it showed potential of using SMS technology for vaccination reminders in Pakistan.<sup>3</sup> Financial incentive through mobile phone was added in few studies to make the intervention more effective. However, majority of these activities are either pilot studies, carried out on a single occasion or limited to a particular geographical location or province.<sup>6</sup>

In order to scale up mHealth based interventions, mobile phone numbers registries of the parents/ caregivers of children eligible for RI needs to be established for mass broadcast of immunization promotion. In addition, mobile phone numbers can be captured after consent from caregivers visiting the EPI centers, mobile phone vendors or government agencies. However it is essential to establish privacy and confidentiality policies guiding the use of information and mobile numbers acquired. Mobile phone based interventions can be of great potential and are a cost effective strategy to not only improve RI coverage in Pakistan but also address barriers to accessing health information and care. However, more research and a clear policy on the application and implementation of mHealth in all provinces is required.

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## Dengue Infection in Pregnancy: Impact on Maternal and Fetal outcomes

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### Abstract

#### Objective

To assess the impact of dengue infection during pregnancy on obstetric and fetal outcomes.

#### Methodology

A retrospective study was conducted by Department of Medicine at a tertiary care hospital in Karachi, Pakistan by reviewing patient records from 2009 – 2015.

Inclusion criteria were pregnant patients of any gestational age fulfilling WHO diagnostic criteria for dengue infection. Exclusion criteria were febrile pregnant patients positive for malaria parasite, immunological tests for malaria or with positive blood cultures, patients diagnosed with HELLP syndrome or other autoimmune disease and patients with drug-induced thrombocytopenia.

Frequencies and percentages were noted for maternal and fetal outcomes being studied.

#### Results

Our data shows that antenatal dengue infection has the potential to significantly impact maternal and fetal outcomes. Antepartum and postpartum hemorrhage each occurred in 5% of patients with acute antenatal dengue infection. Moreover, we note that counts may not be predictive of development of these complications, so extreme clinical vigilance is warranted. Oligohydroamnios occurred in 21% of our patients; this is likely to be a consequence of significant fluid shifts with dengue and hydration of the pregnant dengue patient is paramount. There may be an increased risk of fetal loss.

#### Conclusion

Obstetric complications such as antepartum hemorrhage, oligohydramnios and postpartum hemorrhage can occur with acute dengue infection during pregnancy. Preterm delivery necessitated by these can impact neonatal outcomes (eg low birth weight and APGAR scores). Acute dengue infection

contracted during the 3rd trimester carries high risk of causing pregnancy morbidity. As platelet counts are not predictive of development of bleeding complications, a high index of suspicion and extreme clinical vigilance are warranted.

#### Keywords

dengue; pregnancy; pregnancy complications; hemorrhage; premature birth

#### Introduction

Dengue is the commonest arbovirus infection.<sup>1</sup> 3.9 billion people are at risk.<sup>2</sup> Accurate estimates are hampered by underreporting and misclassification; currently 390 million dengue infections per year are estimated to occur.<sup>3</sup>

Since 1994, dengue fever has become a very significant infectious disease and public health issue in Pakistan; WHO reported the largest ever dengue epidemic from Pakistan in 2012.<sup>4</sup>

Only a few studies<sup>5,6,7,8</sup> have examined the impact of antenatal dengue infection on mothers and neonates, reporting increased risk of obstetric complications and adverse neonatal outcomes. While the literature includes some regional studies<sup>5,6,7,8</sup> to our knowledge, such data has been reported only once from Pakistan with 18 patients surveyed.<sup>9</sup>

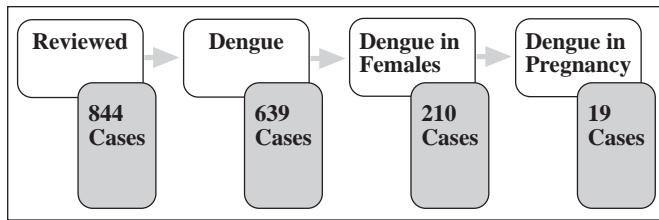
We conducted a retrospective review of records of patients with antenatal dengue infection to help elucidate the impact of dengue infection during pregnancy. Our aim was to acquire objective data to help formulate appropriate management strategies to help in counseling of patients.

The main objective was to assess the impact of dengue infection in pregnancy on obstetric and fetal outcomes.

#### Methodology

A retrospective study was conducted by Department of Medicine at a tertiary care hospital (200 beds, offering post-graduate training in medicine and gynaecology) by reviewing patient records from 2009 – 2015. Records were retrieved from medical record room using ICD codes (061, 065.4, 647.6X). A total of 844 files were reviewed; 19 pregnant patients were identified. (Figure 1)

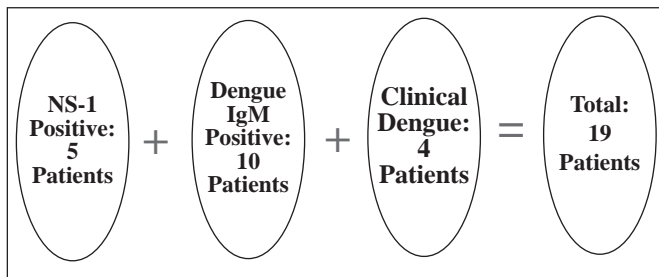
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**Fig 1. Number of cases identified with acute dengue in pregnancy**

Inclusion criteria were pregnant patients of any gestational age fulfilling WHO diagnostic criteria for dengue infection for probable or confirmed dengue.<sup>10</sup>

WHO Diagnostic Criteria	
<b>Probable dengue</b>	
Live in/travel to dengue endemic area. Fever and 2 of the following criteria:	
<ul style="list-style-type: none"> <li>• Nausea, vomiting</li> <li>• Rash</li> <li>• Aches and pains</li> <li>• Tourniquet test positive</li> <li>• Leucopenia</li> <li>• Any warning sign</li> </ul>	
<b>Laboratory confirmed dengue</b>	



**Fig 2. Criteria for identifying patients with acute dengue infection.**

Exclusion criteria were febrile pregnant patients who tested positive for malaria parasite, immunological tests for malaria or with positive blood cultures, patients diagnosed with HELLP syndrome or other autoimmune cause for their symptoms and patients with drug-induced thrombocytopenia.

Clinical parameters of all patients were recorded in individual proforma by the investigators. Patients were followed till the end of their pregnancy for the final outcome including gestational age at delivery, mode of delivery, obstetric, fetal and neonatal complications and maternal and infant mortality (Table 1).

Data was collected from September 2016 to October 2016. It was entered and analyzed on SPSS Software (Version 21). Frequencies and percentages were noted for maternal and fetal outcomes being studied. Ethics review committee of our hospital studied the proposal and pro forma and issued approval (ERC Approval No: 45).

**Results**

A total of 19 pregnant patients were identified as per inclusion criteria (as shown above). General demographic features are shown in table 2. All patients had fever at the time of admission. Fever was the sole presenting feature in 6 (31.6%) patients. Mean fever noted was 102.6°F ± 1.3°F. Clinical features and laboratory parameters pertaining to dengue observed in our patients are shown in table 2.

Dengue-related non-obstetric bleeding occurred in 42%; one quarter of these were hemodynamically significant. 52.6% patients were given platelet transfusion. 1(5.2%) patient presented with severe hemorrhagic dengue and eclampsia. Oligohydroamnios was found at a frequency of 21%. 21% suffered preterm labor and 10.5% had premature rupture of membranes. 2 (10.5%) women with acute dengue in the first trimester suffered pregnancy loss. For details of maternal, fetal

**Table 1: Maternal & Neonatal outcomes in patients with antenatal acute dengue infection**

<i>Maternal Outcomes</i>	<i>Neonatal Outcomes</i>
<ul style="list-style-type: none"> <li>• Antepartum Hemorrhage (APH)</li> <li>• Pregnancy Loss</li> <li>• Oligohydroamnios</li> <li>• Pregnancy induced hypertension (PIH)</li> <li>• Preterm Labor</li> <li>• Premature Rupture of Membrane (PROM)</li> <li>• Dengue related bleeding complication</li> <li>• Transfusion required</li> <li>• C-section</li> <li>• Post partum Hemorrhage (PPH)</li> <li>• Maternal Mortality</li> </ul>	<ul style="list-style-type: none"> <li>• Intra-uterine growth restriction (IUGR)</li> <li>• Fetal Anomalies</li> <li>• Fetal Distress</li> <li>• Meconium Aspiration</li> <li>• Low APGAR (&lt;7)</li> <li>• Prematurity</li> <li>• Low Birth Weight (LBW)</li> <li>• Respiratory Distress Syndrome (RDS)</li> <li>• Neonatal Death</li> </ul>

**Table 2: Demographic, Clinical & Laboratory Parameters of Dengue**

Demographic Features	n (%)
<b>Age</b>	
• Less than 20 Yrs	1 (5.3%)
• 20-30 Yrs	13 (68.4%)
• More than 30 Yrs	5 (26.3%)
<b>Pregnancy Status</b>	
• Primigravida	6 (31.6%)
• Multigravida	13 (68.4%)
<b>Gestational Age at Presentation</b>	
• First Trimester	6 (31.6%)
• Second Trimester	4 (21.1%)
• Third Trimester	9 (47.4%)
<b>Clinical Features</b>	
• Petechiae	2 (10.5%)
• Rash	3 (15.8%)
• Headache	6 (31.6%)
• Back Pain	3 (15.8%)
• Joint Pain	1 (5.3%)
• Nasal Bleed	3 (15.8%)
• Gum Bleed	3 (15.8%)
• Hematuria	1 (5.3%)
• GI Bleed	1 (5.3%)
• Intracranial Bleed	0 (0%)
• Pleural Effusion	5 (26.3%)
<b>Laboratory Parameter</b>	
• Hemoglobin (gm/dl)	Mean ± S.D 10.8 ± 1.2
• Hematocrit (%)	29.9 ± 6.0
• Platelets Initial (x10 <sup>9</sup> /uL)	113.7 ± 77.9
• ALT (IU/L)	132 ± 107.0

and neonatal outcomes see Table 3 & 4.

### Discussion

Dengue has become prevalent in Pakistan. Being a disease that has become endemic to Pakistan relatively recently, there is a need to elucidate and document impact of antenatal infection on pregnancy and child birth. While a handful of studies have reported on such outcomes<sup>5,6,8</sup> only one group has reported such data from Pakistan on 18 patients.<sup>9</sup>

We examined maternal and neonatal outcomes in 19 patients. We found increased obstetric and non-obstetric bleeding in mothers with acute dengue infection, increased risk of premature birth, poor APGAR scores and low birth weight in neonates. Antepartum hemorrhage occurred in 5%. Maqsd reported antepartum hemorrhage in 16% and Agrawal reported it in

32%.<sup>6,9</sup> While all patients in the former study presented with acute dengue in the 3<sup>rd</sup> trimester, 8/19 of our patients contracted dengue before 20 weeks' gestation. Post-partum haemorrhage also occurred in a small percentage in our study in contrast to previously reported 19%-32%<sup>5,6,9</sup> In our group, both antepartum and post partum hemorrhage occurred in the same patient (who had contracted dengue infection at 33 weeks' gestation) and had a platelet count nadir of 85,000/uL. Agrawal<sup>6</sup> reported counts of 14000-82,000 in patients developing antepartum or post partum hemorrhage, suggesting that only the counts may not be predictive of development of these complications.

Non-obstetric bleeding complications attributable to dengue occurred in 42% of our patients. One-fourth of these were hemodynamically significant. Several authors have reported bleeding complications in frequencies ranging from 11-56%.<sup>5-9</sup> Basurko<sup>8</sup> reported a retroperitoneal hematoma in one patient; Sharma<sup>5</sup> reported rectal sheath hematoma in one patient and dengue-shock syndrome in three; Agrawal<sup>6</sup> reported dengue shock syndrome in 20%; Maqsd<sup>9</sup> reported massive epistaxis and recalcitrant bleed from site of C-section leading to death in one patient. Cases of PPH have been reported in the absence of any other bleeding manifestations.<sup>5</sup>

In our study, 10/19(52.6%) patients were given platelet transfusion, frequencies of 62.6% and 89% have been reported.<sup>5,9</sup>

One patient (5.2%), a primigravida with twin pregnancy, presented with eclampsia; she had contracted dengue infection at 33 weeks' gestation and needed immediate emergency Caesarean section. We found no reported association of antenatal dengue infection with pregnancy-induced hypertension. However, several groups<sup>5,6</sup> have noted the possible diagnostic dilemma between acute dengue infection and HELLP syndrome as both conditions are associated with low platelets and transaminitis. Oligohydroamnios is another complication believed to be strongly associated with acute dengue and Sharma<sup>5</sup> have postulated that this may be partly because of dehydration in dengue. We found oligohydroamnios in 21% of our patients. Other groups have reported a significantly higher frequency of oligohydroamnios- 43 – 52%.<sup>5,6</sup>

Pregnancy loss (including abortion and intrauterine death) was observed in 2/19 (10.5%) of our patients while frequencies of 6-25% have been reported by other groups.<sup>5-8,11</sup> Both fetal losses in our study occurred in women who presented with acute dengue in the first trimester. Kariyawasam and Senanayake<sup>7</sup> have postulated that endothelial damage due to dengue infection plays a causative role in adverse fetal outcomes.

Preterm labor occurred in 21%(4/19) of our patients. 1 patient had acute dengue in the 2nd trimester while the other 3 contracted it in the 3rd trimester. 2 of these 4 preterm neonates were completely healthy; 1 developed respiratory distress and the 4th case was a twin delivery with both neonates having low

**Table 3: Maternal and fetal outcomes recorded for each patient**

Age	Parity	Gestational Age at Presentation	Gestational Age at Delivery	Mode of Delivery	Obstetrics Outcomes	Neonatal
22Y	M	3 <sup>rd</sup> trimester	Pre term	C Section	None	Healthy baby
33Y	M	3 <sup>rd</sup> trimester	Term	C Section	None	Healthy baby
23Y	P	3 <sup>rd</sup> trimester	Term	Spontaneous Vaginal	None	Healthy baby
18Y	M	2 <sup>nd</sup> trimester	Pre term	C Section	Breech Presentation	Healthy baby
35Y	M	1 <sup>st</sup> trimester	-	-	Missed Abortion	-
33Y	M	1 <sup>st</sup> trimester	Term	C Section	None	Healthy baby
28Y	P	3 <sup>rd</sup> trimester	Term	C Section	Oligohydroaminos	Healthy baby
30Y	M	3 <sup>rd</sup> trimester	Term	C Section	None	Healthy baby
33Y	M	2 <sup>nd</sup> trimester	Term	C Section	PROM	Healthy baby
22Y	P	3 <sup>rd</sup> trimester	Term	Operative Vaginal	PROM	Healthy baby
25Y	M	3 <sup>rd</sup> trimester	Pre term	C Section	APH, PPH	RDS
30Y	M	1 <sup>st</sup> trimester	Lost to F/U	-	-	-
29Y	M	1 <sup>st</sup> trimester	Term	C Section	None	Healthy baby
27Y	M	3 <sup>rd</sup> trimester	Term	Operative Vaginal	Oligohydroaminos	Healthy baby
24Y	P	1 <sup>st</sup> trimester	Term	C Section	Fetal Distress	Meconium Aspiration
30Y	M	1 <sup>st</sup> trimester	Term	Spontaneous Vaginal	Twin Pregnancy, Intrauterine Death of one fetus	Healthy baby
23Y	P	2 <sup>nd</sup> trimester	Term	C Section	Oligohydroaminos, Breech Presentation	Healthy baby
23Y	P	3 <sup>rd</sup> trimester	Pre term	C Section	Twin Pregnancy, Eclampsia, Maternal Death after 1 week of delivery	Premature, LBW (1.9 & 1.5 kg)
33Y	M	3 <sup>rd</sup> trimester	Term	Spontaneous Vaginal	Oligohydroaminos	Healthy baby

**Table 4: Maternal & Neonatal Outcomes in Dengue**

Maternal Outcomes	n (%)	Neonatal Outcomes	n (%)
Antepartum Hemorrhage (APH)	1 (5.2%)	Intra-uterine growth restriction (IUGR)	0 (0%)
Post partum Hemorrhage (PPH)	1 (5.2%)	Fetal Anomalies	0 (0%)
Dengue related bleeding complication	8 (42%)	Fetal Distress	1 (5.2%)
Platelet Transfusion	10 (52.6%)	Meconium Aspiration	1 (5.2%)
Oligohydroaminos	4 (21%)	Respiratory Distress Syndrome (RDS)	1 (5.2%)
Pregnancy induced hypertension (PIH)	1 (5.2%)	Low APGAR (<7)	2 (10.5%)
Preterm Labor	4 (21%)	Low Birth Weight (LBW)	2 (10.5%)
Pregnancy Loss	2 (10.5%)	Prematurity	4 (21%)
Premature Rupture of Membrane (PROM)	2 (10.5%)	Neonatal Death	0 (0%)
C-section	12 (63.1%)		
Maternal Mortality	1 (5.2%)		

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birth weight. It is worth noting that there were no major maternal complications in the 2 healthy preterm neonates. However, the preterm neonates who had above-mentioned adverse effects had mothers with severe complications, namely antepartum hemorrhage in one and eclampsia in the other. Studies have reported a variable rate (9-68%) of preterm labor.<sup>5,6,8,9,11</sup>

Premature rupture of membranes occurred in 10.5% (2/19) of our patients; 1 had contracted dengue in the 2nd trimester and the other in the 3rd trimester. Both neonates were healthy. One other study<sup>6</sup> found a frequency of 4%.

C-Section was done in 63.1% (12/19) of our patients; only 2 of these could be ascribed to complications caused by acute dengue- the remainder were for obstetric indications unrelated to dengue infection. Maqsood<sup>9</sup> reported C-section rate of 77.7% and Agarwal<sup>6</sup> reported it in 32%.

Fetal and neonatal outcomes were examined. We did not find any cases of intra-uterine growth restriction (IUGR) or fetal anomalies. One study reported fetal anomalies in 13.6% ; none of the studies we reviewed specifically examined intrauterine growth restriction.

In our study one neonate had fetal distress along with meconium aspiration. Basurko reported fetal distress in 7.5% neonates<sup>8</sup> while Sharma reported meconium aspiration in 6%.<sup>5</sup>

Respiratory distress syndrome occurred in 1 neonate (5.2%) whose mother had antepartum as well as postpartum hemorrhage while Ismail *et al* reported it in 12.5%.<sup>11</sup> Low APGAR was also observed in 10.5% neonates. We did not find any other study reporting on APGAR scores. Low Birth Weight (LBW) occurred in 10.5% neonates. Two other studies reported LBW in 22% and 52% respectively.<sup>6</sup> Prematurity was found in 21% neonates while other studies have reported prematurity from 13-37%.<sup>5,6,8,11</sup> No neonatal death occurred in our study but other studies have reported it in 1.9-20%.<sup>5,6,8</sup>

The strengths of our study are that it adds to the very meagre data available from our country. We have attempted to document most obstetric and neonatal outcomes. The weakness of our data

lies in its retrospective nature. Also, neonates were not specifically investigated to determine vertical transmission of acute dengue.

### Conclusion

Antenatal dengue infection has the potential to adversely affect outcomes, especially when contracted in the 3rd trimester. Attention must be paid to providing adequate fluid resuscitation. Bleeding complications bear no correlation to platelet counts.

### Funding/Conflict of interest

This study does not have any source of funding. No conflict of interest exists for any investigators and none is declared.

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## Infection Control Initiative: Epidemiology & what we can do?

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### Abstract

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#### Background and Objective

Hospital acquired infections occur due to cross infection from one patient to another or by doctors, nurses or other hospital staff, and should be addressed in addition to offering optimal healthcare and treatment measures. All hospitals should ensure basic infection control mechanisms which are the key to control infections. A study was conducted in a private tertiary care set up to assess the infection control status and observance of protocols with the aim to conduct critical self appraisal to improve healthcare services.

#### Material and Methods

A structured questionnaire based on the standards used by Government of Pakistan was adapted and data was collected by the faculty members. Non-probability sampling technique with focus on major departments of the hospital having higher patient loads were used. The data was collected by direct observation, checking of records and interviews as needed from the Emergency Unit, Operation theatre, Wards (Medical, Surgical, and Gynaecology & Obstetrics) and Outdoor Unit, Labour room, ICU (Adult & Paediatrics) and Nursery. Data was compiled and analysed using SPSS version 17. Microsoft Excel was used for graphic presentation. Study was conducted from February 2015 to March 2015.

#### Results

It was observed that basic infection control measures were available, Anti disinfectants (69%), Sterilized equipment (67%) and clean supplies (94%). Precautionary measures were being ensured in major areas such as, prevention of bloodstream infections (74%), perinatal precautions (78%) and prevention of UTI (55%). Hand hygiene practices were promoted (79%), however the waste disposal (18%) was at sub-par level. Inadequacy of water supply (32%) was also observed. Compliances were based on interviews taken and observations done then recorded in the questionnaire, in all the areas visited by the investigators.

#### Conclusion

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Our study concluded that the infection control measures are being followed in an adequate manner, with no gross deficiencies; however, it identified some areas for further improvements like waste disposal mechanisms and adequacy of water supply.

#### Background

In an ideal healthcare setup patients should receive the optimal healthcare which includes measures for preventing infections that may be acquired by the patients during their hospital stay. All hospitals should ensure basic infection control. Worldwide, hospital acquired infections are considered the most debilitating infections effecting developing and underdeveloped countries. Eastern Mediterranean and South East Asian regions having the highest frequencies, 11.8% and 10.0% as compared to 7.7% and 9.0% in the European and Western Pacific regions.<sup>1</sup> In Pakistan, morbidities and premature mortalities can be attributed to infectious diseases. So it is pertinent to control these diseases especially nosocomial infections which are on the rise.<sup>2, 3, 4</sup> Infection control in hospitals is the key to success in preventing hospital acquired infections especially in countries like Pakistan where, there is lack of proper guidelines for infection control and prevention.<sup>5,6</sup> According to the guidelines, hand hygiene, safe injections, hospital waste management, sterilization and disinfection of instruments are important aspects that are included in infection control. Pakistan is facing a dilemma of rise in Hepatitis B, C and HIV/AIDs as a result of poor infection control in the hospitals, so there is a dire need to identify the gaps in infection control protocols.<sup>7</sup> Although all hospitals emphasize on protocols of proper hand washing but compliance with this most important of precautionary measures is scarce.<sup>8, 9</sup>

The developing world has a high prevalence of hospital acquired infections and there is a dire need to improve the infection control; systemic reviews illustrate the scarcity of data, also.<sup>10</sup>

#### Objective

This study is an attempt to assess the infection control status and observance of protocols with the aim to conduct self appraisal to improve the healthcare services in a tertiary care setup.

#### Materials and Methods

A cross sectional survey was conducted in a tertiary care setup in Lahore, Pakistan. A structured questionnaire<sup>11</sup> based on the standards used by Government of Pakistan was developed and

adapted. Data was collected by the faculty members by direct observation for the selected variables, checking of records and interview of the employees. Faculty members visited the Emergency Unit, Operation Theatres, Wards (Medical, Surgical, Gynaecology & Obstetrics, Paediatrics) and Outdoor Units, Labour room, ICU (Adult & Paediatrics) and Nursery. Data was compiled and descriptive analysis was done using SPSS version 17. Microsoft Excel was used for graphic presentation. Study was conducted from February 2015 to March 2015.

### Results

In the current study, it was observed that an optimal infection control was being maintained by the hospital all basic measures were available, Anti disinfectants (69%), Sterilized equipment (67%) and clean supplies (94%). In the current setup precautionary measures were being ensured. During visit to various sites of the hospital the faculty observed that prevention of bloodstream infections (74%), perinatal precautions (78%) and prevention of UTI's(55%) was optimal. Hand hygiene practices were being promoted (79%) and most of the hospital staff was complying with the hand hygiene protocols. However the waste disposal (18%) was at sub-par level. Inadequacy of

water supply (32%) was also observed. Compliances were based on interviews taken and observations done and recorded in the pre designed questionnaire, in all the areas visited by the investigators.

### Discussion

Health care delivery system is facing the dilemma of health care associated infections. Mortality and financial losses in the health care delivery system can be attributed to healthcare associated infections.<sup>12</sup> The current initiative has been taken to assess the infection control status and observance of protocols in a tertiary care setup.

The results of the current study depict that satisfactory infection control was being maintained with the provision of basic measures. Precautionary facilities and infection control protocols were being followed. As documented in other studies too, provision of pharmacological agents and hygienic hospital environment leads to better infection control and reduction of hospital acquired infections.<sup>13</sup> A study conducted in Africa documents that inadequate infection control is attributed to poor hygiene, in-availability of resources, poor infrastructure, lack of staff awareness and defective infection control.<sup>14</sup> Perhaps

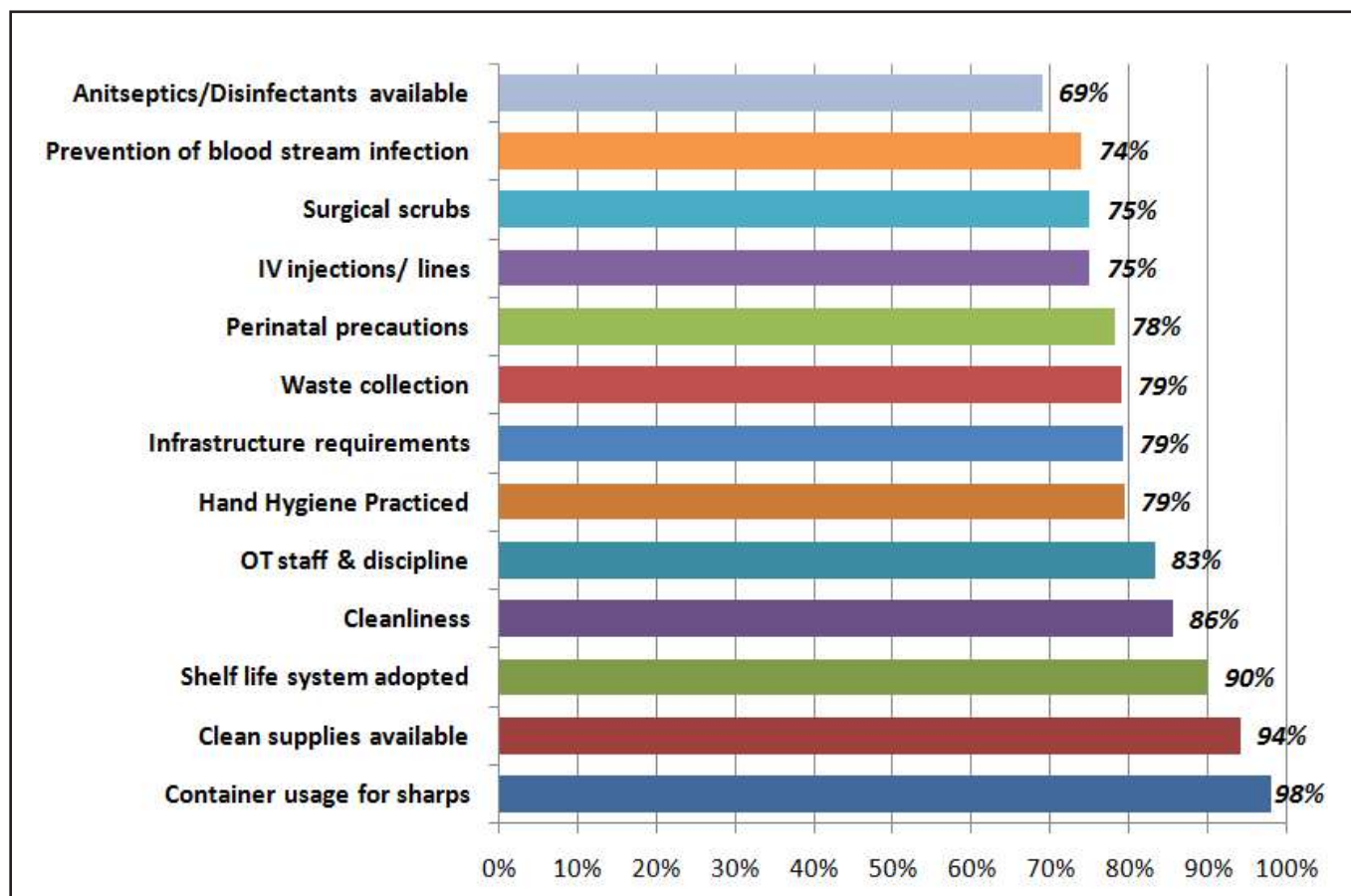


Fig 1. Frequency of achievement of infection control standards

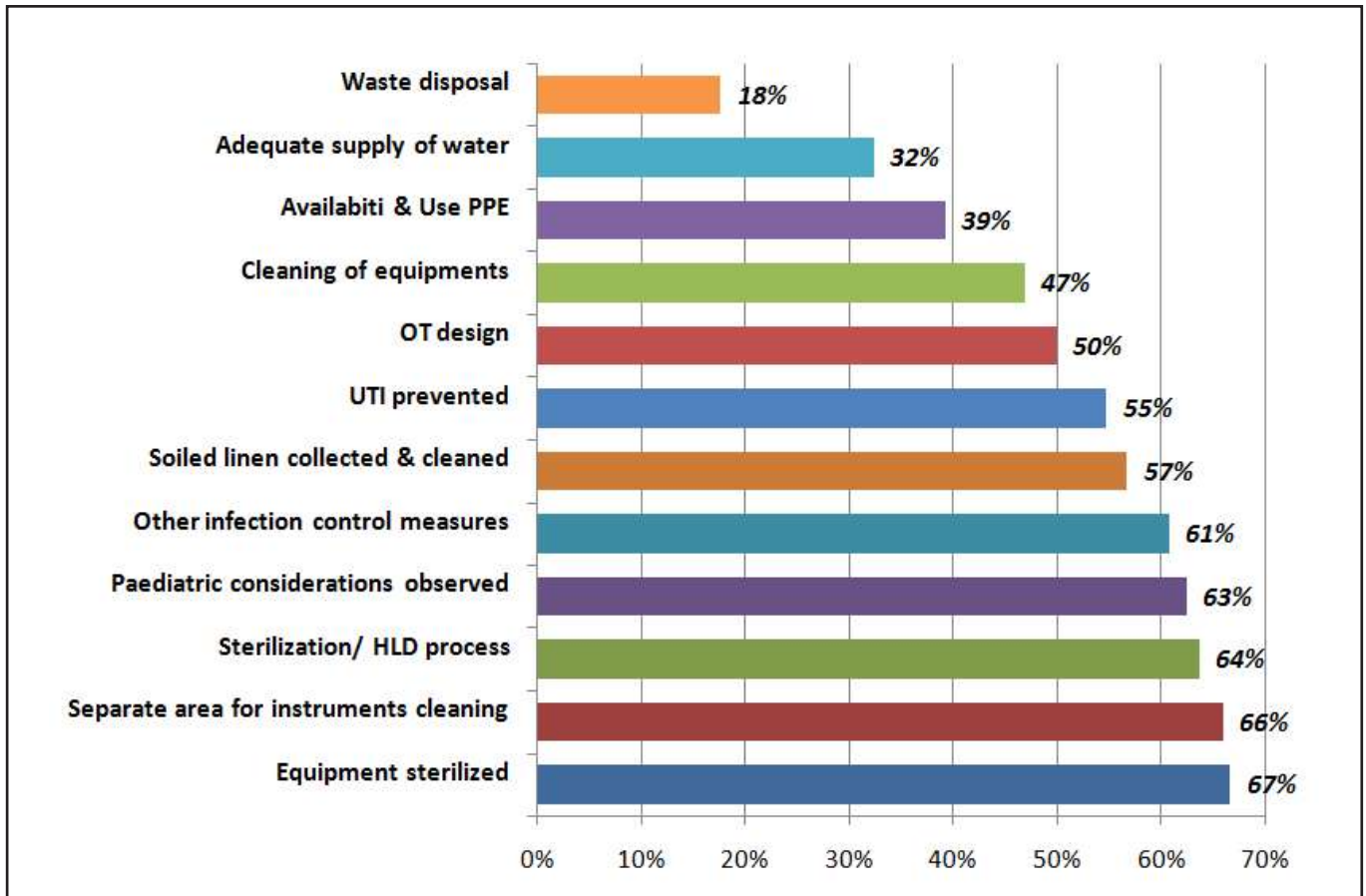


Fig 2. Frequency of achievement of standards, according to various criteria

Table 1: Compliance of various criteria in the Operation Theatre

Availability & use of PPE	Antiseptics/Disinfectants available	Equipment sterilized
77%	72%	66%

PPE: Personal Protective Equipment

a deeper insight into this issue may address such situations in our set up, which could not be established by our study.

In the current study, during visits to various sites of the hospital the faculty observed that prevention of bloodstream infections 74%, perinatal precautions 78% and prevention of UTI's 55% was optimal. These findings are concurrent with the findings of a study conducted in Senegal to evaluate the infection control program of their setup. After implementing the program a significant reduction in the bloodstream infections 8.8% to 2.0% (p value 0.01), was observed.<sup>15</sup> Similar findings are supported by a study conducted by Mulu and Kibru attributing blood stream infections in 2.4% of the patients due to improper

hygienic practices of the healthcare staff and environment.<sup>16</sup> Hand hygiene is of utmost importance in any healthcare setup. WHO has developed guidelines and protocols for hand washing for all healthcare staff to adopt.<sup>17</sup> Compared with a study in Iran which illustrated a low level of hand hygiene in the staff although 67.9% had average and 29.9% had good knowledge regarding infection control practices. Most of them agreed to the importance of following infection control protocols although in spite of good knowledge,<sup>18</sup> this study had showed much better results.

### Conclusion

Our study concluded that the infection control measures in the current tertiary setup, are being followed with some room for improvement. The areas identified for further improvement were mainly related to waste disposal mechanisms and protocols and adequacy of water supply; these need to be addressed.. Based on the infection control assessment protocols, it is recommended that all the individual units/departments should consider having their own and self-appraisal on regular basis with an aim to achieve standardization. Vigilant observation for infection control in tertiary hospital will ensure better performance and making national and international certification a requirement will help promote better practices.

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## Recommendations

All healthcare personnel, and not just doctors, should be educated about the principles of infection control, and individual responsibility should be stressed upon. All departments should work in collaboration with the infection control department and cooperate in monitoring in case of any infectious exposure. If such an exposure occurs, the employee should be provided adequate care. Risk assessment should be done for work related preventive measures. Immunization record of all employees should be maintained confidentially, and immunization programs should be run free of cost for all healthcare employees to protect them from diseases like hepatitis B, and tetanus etc. Tuberculosis screening program should be advised in all healthcare set ups as Pakistan is endemic in this chronic disease. The infection control committee should work in harmony with the administration to develop sustainable transmission control measures.

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## Periorbital and Orbital Cellulitis in Children. A retrospective study

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### Abstract

#### Background

Periorbital and orbital cellulitis can be a complicated disease in children and may lead to vision loss. Sinusitis is a universal predisposing factor, in particular ethmoid sinusitis. External eye infections, trauma and dental abscesses may be contributing factors. *Staphylococcus aureus* remains an important pathogen, and poses problems particularly with increasing drug resistance. We aim to report the clinical, demographic and microbiological profile of children with periorbital and orbital cellulitis. We also analyzed the risk factors for positive bacterial cultures among children with periorbital and orbital cellulitis from a tertiary care center.

#### Method

This was a retrospective chart review of children (1 month – 15 years) with a discharge diagnosis of periorbital and orbital cellulitis, from July 2009 to June 2014 in the department of Paediatrics, Aga Khan University Karachi. Clinical and demographic feature and laboratory data were collected and analyzed. Risk factors of positive blood cultures were also analyzed.

#### Results

The medical records of 34 children with a discharge diagnosis of orbital or periorbital cellulitis were reviewed. It was found that most of the children (n=18; 53%) were younger than 5 years of age. Most affected were males (n=21; 62%). The left eye was involved in most of the cases (n=14, 41%). The main presenting complaints included pain, redness around the eyes and fever. Eyelid infection was found to be the most common etiological factor predisposing to periorbital /orbital cellulitis (n=7, 21%). Young age remains the main risk factors for bacterial positivity.

#### Conclusion

Periorbital and orbital cellulitis are a relatively rare the in children. Periorbital cellulitis if treated well can prevent orbital complications. *Staphylococcus aureus* is the main pathogen and sinusitis remains the main risk factors.

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#### Keywords

Periorbital, orbital cellulitis, Children, Sinusitis

#### Introduction

Periorbital cellulitis occurs mostly in children younger than 5 years of age and is almost three times more common than orbital cellulitis.<sup>1,2</sup> It is also called preseptal cellulitis because the infection arises anterior to the orbital septum which is a layer of fibrous tissue that begins from the periosteum of the skull and continues into the eyelids. Periorbital tissues may become infected in two ways: trauma or primary bacteremia.<sup>3</sup> Etiologically, it is seen as an extension of infection from sinuses surrounding the orbit. Ethmoid sinus is the most common source of orbital infection because a very thin septum separates it from the orbit. In acute sinusitis, *Streptococcus pneumoniae* and *Haemophilus influenzae* are the predominant causative organisms whereas anaerobes are the commonly found organism for chronic sinusitis.<sup>4,6</sup>

Children usually present with either history of recent sinusitis, upper respiratory tract infection or trauma. Mostly non-ophthalmological manifestations are common, however, its extension may lead to ophthalmological manifestations (i.e., proptosis, pain and restriction of extraocular movement, conjunctival chemosis, decreased vision and elevated intraocular pressure). Computed Topography (CT) of orbits and sinuses are essential to identify etiology and rule out involvement of the eye.<sup>7,8</sup> Microbiological identification of pathogens is difficult; as theyield of bacterial blood culture remains low and pus culture requires surgical intervention. Hencebroad spectrum antibiotics are essential.<sup>5</sup>

Orbital cellulitis patients presents with orbital signs such as proptosis, pain, and loss of vision. The presence of orbital signs concurrently with signs of acute sinusitis helps in ruling out periorbitalcellulitis.<sup>4,6,9</sup> However, it is recommended that imaging such as MRI is used to confirm the diagnosis. We aim to review the clinical presentation and management of children presenting with periorbital and orbital cellulitis and the risk factors for positive bacterial cultures among children with periorbital and orbital cellulitis in our tertiary care center at Aga Khan University, Karachi.

#### Methods

We retrospectively reviewed the medical records of all children

(1 month – 15 years) with a discharge diagnosis of periorbital and/or preseptal and orbital cellulitis at the Aga Khan University Karachi, during the period from July 2009 to June 2014. Cases were identified using discharge records for preseptal, periorbital cellulitis and orbital cellulitis with International Classification of disease (ICD-10) 373.13 and 376.01 respectively.

Children with chronic periorbital cellulitis or on periorbital cellulitis treatment or who had had surgical procedure at the time of admission were excluded. Patients with non-infectious etiologies leading to periorbital swelling and edema were also excluded. Data including medical record number, age in months, gender, antibiotic therapy prior to hospitalization, presenting complaints, laboratory investigations (anemia, leukocytosis (WBC >10,000), thrombocytosis (platelet count >400)); site of eye involvement (right, left or both), management procedure (surgical or medical management), isolated microorganism (bacterial cultures from blood and/or pus culture), duration of antibiotic and disease or procedure related complications were recorded. Statistical analysis was performed by using SPSS software package (version 19.0, SPSS Inc. Chicago, IL). All patients received antibiotic therapy. Continuous variables including age (in months), weight on admission (Kg), duration of presenting illness (i.e., duration of fever and pain) and duration of hospital stay were mentioned in mean and standard deviation; however categorical variables i.e., (gender, sinuses involvement and discharge disposition) were mentioned in frequency and percentages.

## Results

A total of 34 children were discharged with a diagnosis of periorbital cellulitis from July 2009 to June 2014. Mean age was 69±5 months (Median 59 mo.); eighteen (53%) were five years old (Table 1). Males were predominant (n=21; 62%). Pain and redness around the eye (n=33, 97%) and fever (n=22, 65%) were the major presenting complaints. Only 8 (34%) were on some antibiotics at the time of presentation. The left eye was involved in 41% (n=14), both sides in 35% (n=12) while 8% (n=8) patients had right sided involvement at the time of presentation. Most (n=24, 71%) of the children had an underlying risk factors including sinusitis (n=6, 18%), eyelid infection (n=7, 21%), underlying immunodeficiency (n=8, 24%), underlying malignancy (n=5, 15%), and six had trauma. On eye examination ophthalmoplegia (n=14, 41%), chemosis (n=6, 18%), proptosis (n=5, 15%) and visual impairment in one child were found. Most of the children underwent radiological investigation, CT scan (n=15, 44%) and MRI (N=5, 15%). Radiological manifestations are presented in Table 2. Ethmoidal sinus was the most frequent underlying cause of periorbital cellulitis in children.

Blood cultures were conducted in almost all cases. Duration of treatment varied (median 14 days). Median hospital stay was 5 days. Most of the patients (80%) were followed-up in the clinic for 4-6 weeks. None of the patients developed any

**Table 1: Clinical manifestations of Children admitted with Orbital and Periorbital Cellulitis**

Characteristics	n = 34
Male n, %	21 (62%)
Age in months <i>median</i> (25 <sup>th</sup> , 50 <sup>th</sup> , 75 <sup>th</sup> percentile)	59 (16, 59, 108)
WAZ <i>median</i> (25 <sup>th</sup> , 50 <sup>th</sup> , 75 <sup>th</sup> percentile)	-0.92 (-2.09, -0.92, 0.62)
Total Leukocyte count (10 <sup>3</sup> mm <sup>3</sup> ) <i>median</i> (25 <sup>th</sup> , 50 <sup>th</sup> , 75 <sup>th</sup> percentile)	16 (8, 16, 20)
Neutrophils (10 <sup>3</sup> mm <sup>3</sup> ) <i>median</i> (25 <sup>th</sup> , 50 <sup>th</sup> , 75 <sup>th</sup> percentile)	68 (43, 68, 79)
C-reactive protein <i>median</i>	16.23

**Table 2: Radiological findings of the children with Periorbital and Orbital Cellulitis**

Features	n (%)
<b>Sinusitis</b>	
Frontal	4 (12)
Ethmoidal	11 (32)
Maxillary	8 (24)
Sphenoid	5 (15)
Periorbital swelling	5 (15)
Retro-orbital swelling	2 (6)
Intra-orbital extension	1 (3)
Intra-cranial extension	3 (9)
Mass lesion	2 (6)
Proptosis	4 (12)
Pus collection	1 (3)
Soft tissue swelling	7 (21)
Pre-septal swelling	4 (12)

complications either during a hospital stay or during follow-up. Table 3 summarizes the microbiological profile of children with periorbital and orbital cellulitis. We performed the risk analysis, however no risk factor was found for positive bacterial culture (table 4).

## Discussion

Periorbital cellulitis is rare in children. Most of the children diagnosed were males and less than 5 years of age. Pain, redness and fever were the main clinical features. Left eye involvement was seen in most of the cases; however, younger children presented with bilateral involvement. The ethmoidal sinus was

**Table 3: Microbiological profile of children with Periorbital and Orbital Cellulitis**

Culture	Microbiological profile	N = 36
Blood	No growth	28
	<i>Streptococcus pneumoniae</i>	1
	<i>Streptococcus milleri &amp; species</i>	2
	<i>Staphylococcus aureus</i>	1
	<i>Pseudomonas aeruginosa</i>	1
	<i>Staphylococcus species</i>	3
Pus	Not done	31
	No growth	1
	<i>Staphylococcus aureus</i>	4

The diagnosis is based on the clinical signs.<sup>10,11</sup>

There was a slight male predominance observed in our study which can possibly be explained by the fact that males are more prone to trauma.

*Staphylococcus* remains the most common pathogen. However, causative organism is related to the pathogenesis of infection. Post-traumatic periorbital cellulitis usually is caused by *Staphylococcus aureus* or *Streptococcus pyogenes*. Previously *Streptococcus pneumoniae* and *Haemophilus influenzae type b* were the most common cause of bacteremia and sinusitis, but after the introduction of vaccination they have become less prevalent.<sup>12</sup> Intravenous antibiotics followed by oral antibiotics are the cornerstone of treatment. Surgical management is indicated if there is pus collection or intracranial extension, to prevent long term sequelae.

**Table 4: Risk factors associated with positive culture in children with Periorbital and Orbital Cellulitis**

	Positive culture N=9	Negative culture N=25	p-value
<b>Gender, Male</b>	5	16	0.65
<b>Infants</b>	5	3	0.01
<b>Laboratory parameters</b>			
Leukocytosis	5	17	0.98
Neutrophilia	7	16	0.44
Thrombocytosis	5	14	0.98
<b>Risk factors</b>			
Otitis media	--	25	--
Sinusitis	2	4	0.64
Eye lid infection	1	6	0.64
Immunodeficiency	1	7	0.40
Malignancy	1	4	0.99

involved in most children and. *Staphylococcus aureus* was the most common pathogen identified

Acute sinusitis leading to periorbital cellulitis remains the most common underlying etiology. There may be other more obvious local causes such as a sty or chalazion, spreading conjunctivitis or dacryocystitis.<sup>1,6</sup> It also may result from a breach in the skin caused by superficial trauma, animal bites or local infections. However, systemic signs remain negative. Ethmoidal sinusitis leading to periorbital cellulitis is important as the lamina papyracea is thin (separating the sinus from the orbit). The infection may spread from the sinus into the adjacent orbit. Its extension may collect as a subperiosteal abscess, causing exotropia, proptosis, and restriction of eye movement nasally.

### Conclusion

Pre existing sinusitis, male predominance and left eye involvement are the commonest features. *Staphylococcus aureus* remains the main pathogen.

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## CASE REPORT

### Coral Reef Injury : Case report

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#### Key words

Coral reef, recreational marine activities, stings, lacerations, localized erythema, necrotizing fasciitis

#### Case Report

A 25 years old previously healthy male presented with erythema, pain, swelling and itching over his right knee, anterior thigh and groin. A week back he had cut his right knee against a coral reef while swimming in the ocean off the coast of Thailand. There was a break in the skin as it bled and scabbed over (Fig. 1). He felt slightly feverish but the temperature was not documented. He had consumed alcohol before and after the injury on holiday, but no shellfish. Apart from the extensively spreading erythema of skin, there were no signs of inflammation of deep tissues or joint. Total white blood cell count was 9660/cm<sup>3</sup> initially, with 60% polymorphs, eosinophils of 8%. Total white blood cell count rose to 12.4/cm<sup>3</sup>, and C-reactive protein was 12.95 mg/dl. Other routine hematology and chemistry values were normal.

He received a single injection of cefperazone /sulbactam and oral doxycycline for 3 days, followed by oral clindamycin,



**Fig. 1. Right knee coral reef injury (with permission of patient)**

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ibuprofen and antihistamine for one week. He improved progressively and the pain and erythema resolved at the end of two weeks.

#### Discussion

Coral reefs are dense coral colonies held together by a calcium carbonate skeleton forming diverse underwater ecosystems. Corals are small marine animals belonging to the class *Anthozoa*, phylum *cnidarian*. The individual colonies are called polyps, residing in the seabed.<sup>1</sup> Each polyp has a soft cylindrical body crowned by an oral disc with a bunch of tentacles that secrete a hard, protective exoskeleton of calcium carbonate. Polyps reproduce by budding, but remain attached to each other, forming a compact multi polyp colony with a common skeleton, which may be several meters in diameter.

Recreational water sports are increasingly the cause of coral reef injuries which may have myriad cutaneous manifestations, ranging from mild localized erythema to life threatening necrotizing fasciitis with septicaemia.<sup>2,3</sup>

Some species of coral e.g the fire coral, sting causing mild pain, pruritis, erythematous rash or urticaria, lasting a few days. The sting is due to venomous coral capsules called nematocysts.<sup>4</sup> The pain is toxin related and can easily be controlled by immersion of affected area in hot water to tolerance.<sup>1</sup> In addition, hydroids, sea anemones and some sponges commonly found in shallow reef beds can also sting, causing minor allergic manifestations. Sea urchins are common reef inhabitants that injure divers by embedding their spine under the skin, leading to local inflammation and irritation until it is removed.

In contrast, lacerations from accidental brush up against a rough coral surface are prone to secondary bacterial infection. The resulting soft tissue infection usually presents in a few days, and may cause cellulitis, lymphangitis or ulceration, and is frequently polymicrobial<sup>5</sup> with skin flora like *Streptococci*, *S aureus*, *S epidermidis*, *Bacillus spp*, *Propionibacterium acnes*, *Acinetobacter calcoaceticus* and *Corynebacterium spp* being the most common bacterial isolates. Other virulent water borne pathogens seen in traumatic marine injuries are predominantly facultative gram negatives like *Vibrio spp*, *Aeromonas spp*, *Pseudomonas spp*, coliforms such as *Escherichia Coli* and *Enterobacter cloacae*, *Bacteroides spp*, *Chromobacterium violaceum* and *Salmonella spp*.<sup>5,6</sup> *Erysipelothrix rhusiopathiae*,

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*Mycobacterium marinum*,<sup>4</sup> and occasionally *M fortuitum*<sup>1</sup> are also capable of causing localized skin infection.

Management of reef associated laceration includes thorough wound cleansing with saline, removal of foreign bodies e.g bits of coral, debridement of devitalized tissue, antibiotics to cover all possible marine pathogens, immersion in hot water to tolerance (43-46C) and analgesics.<sup>7</sup> A close follow up is required because of the risk of serious infection.

The most serious infection following coral cut is salt water necrotizing fasciitis after wound contamination with vibrio spp which include the halophilic *V. parahemolyticus*, *V. vulnificus*, *V. alginolyticus*, *V. fluvialis*, *V. hollisae*, *V. damsela*, *V. furnissii*, *V. metschnikovii*, and *V. cincinnatiensis*.<sup>8</sup> Among them, the epidemiology and virulence of *V. vulnificus*, which is a common cause of invasive human diseases, are well described.<sup>9</sup> Specific conditions making patients susceptible to *Vibrio* infections include alcoholism, cirrhosis, oral steroid therapy, polycystic kidney disease, leukopenia, hemochromatosis and multiple myeloma<sup>6</sup> Likewise, age, male sex, chronic renal failure, diabetes, peripheral vascular disease and drug abuse also increase the risk of a life threatening infection.<sup>10</sup>

Necrotizing fasciitis is characterized by extensive and progressive necrosis of the skin and fascia with sepsis, requiring expedient diagnosis and aggressive treatment with broad-spectrum antibiotics and surgical debridement. The lesions are extremely painful, dusky, tense and swollen, with frequent haemorrhagic bullae and crepitus. A high index of suspicion must be maintained with cases of severe and advancing cellulitis to prevent multi organ failure and death.<sup>2</sup>

## Conclusion

Coral infections associated with marine activities in salt water, particularly related to work or recreation, present unique diagnostic challenges for the infectious disease practitioner. The clinician must be alert to these types of injuries, most of which are mild, needing only local wound care; however, some may lead to life threatening infections. Our patient was young and previously healthy. He was probably stung by a fire coral that did not cause systemic or serious consequences. Hence his recovery was rapid and uncomplicated.

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## Instructions to Authors

### Scope

The Infectious Diseases Society of Pakistan sponsors the Infectious Disease Journal of Pakistan (IDJ). The Journal accepts Original Articles, Review Articles, Brief Reports, Case Reports, Short Communications, Letter to the Editor and Notes and News in the fields of microbiology, infectious diseases, public health; with laboratory, clinical, or epidemiological aspects.

### Criteria for publication

All articles are peer reviewed by the IDSP panel of reviewers. After that the article is submitted to the Editorial Board. Authors may submit names and contact information of 2 persons who potentially could serve as unbiased and expert reviewers for their manuscript, but IDSP reserves the right of final selection.

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Manuscripts must be formatted according to submission guidelines given below, which are in accordance with the "Uniform Requirements for Manuscripts Submitted to Biomedical Journals" (originally published in *N Engl J Med* 1997;336:309-15). The complete document appears at [www.icmje.org](http://www.icmje.org). Please submit one complete copy of the manuscript and all enclosures to **The Managing Editors, Infectious Diseases Journal of Pakistan, Department of Pediatrics & Child Health, The Aga Khan University, Stadium Road, P.O. Box 3500, Karachi 74800, Pakistan**. An electronic copy of the manuscript must also be sent to [pak\\_idj@yahoo.com](mailto:pak_idj@yahoo.com). All manuscripts submitted to IDJP must be accompanied by an Authorship Declaration stating that '*The authors confirm that the manuscript, the title of which is given, is original and has not been submitted elsewhere. Each author acknowledges that he/she has contributed in a substantial way to the work described in the manuscript and its preparation*'. Upon submission a manuscript number will be assigned which should be used for all correspondence.

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Abstract should not exceed 250 words and must be structured in to separate sections headed *Background, Methods, Results and Conclusions*.

Please do not use abbreviations or cite references in the abstract. A short list of four to five key words should be provided to facilitate.

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The section must clearly state the background to the research and its aims. Controversies in the field should be mentioned. The key aspects of the literature should be reviewed focusing on why the study was necessary and what additional contribution will it make to the already existing knowledge in that field of study. The section should end with a very brief statement of the aims of the article.

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Present results in logical sequences in the text, tables and illustrations. Articles can have a maximum of 5 illustrations (in a combination of figures and tables) per article. The results should be in past tense and repetition of results presented in the tables should be avoided. Exact *P*-values should be reported along with reporting of OR and RR with their Confidence Intervals where applicable.

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Emphasize the new and important aspects of the study and conclusions that follow from them. Do not repeat the details from the results section. Discuss the implications of the findings and the strengths and limitations of the study. Link the conclusions with the goals of the study but avoid unqualified statements and conclusion not completely supported by your data.

### Acknowledgments

Acknowledge any sources of support, in the form of grants, equipment or technical assistance. The source of funding (if any) for the study should be stated in this section. Please see below for format of **References, Figures and Tables**.

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Authoritative and state of the art review articles on topical issues are also published, with a word limit of 2000. It should consist of critical overview of existing literature along with reference to new developments in that field. These should be comprehensive and fully referenced. Articles should contain an Abstract; Main Text divided into sections, Conclusions and References.

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Announcements of conferences, symposia or meetings may be sent for publication at least 12 weeks in advance of the meeting date. Details of programs should not be included.

## References

Number references consecutively in the order in which they are first mentioned in the text. Identify references in text, tables and legends by Arabic numerals (in superscript). References cited only in tables or in legends to figures should be numbered in accordance with a sequence established by the first identification of the particular table or illustration. Bibliography should be given in order. Authors, complete title, journal name (Abbr), year, vol, issue, page numbers. According to "Uniform

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Illustrations should be numbered, given suitable legends and marked lightly on the back with the author's name and the top edge indicated. Original drawings may be submitted although high quality glossy photographs are preferable. They should be kept separate from the text. If possible, figures should be submitted in electronic format as either a TIFF (tagged image file format) or JPEG format. Minimum resolution for scanned artwork is:

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**Instructions updated - April 2012.**

**Editor IDJ**