plasma (FFP) and random donor platelets (RDP) were randomly
components such as Packed red blood cells (PRBC), fresh frozen
652 stored units of screened whole human blood and blood
from January, 2015 to July, 2018. During the period of study, a total of
referral teaching hospital, Andhra Pradesh, India during the period
at Department of Transfusion Medicine attached to a tertiary care
This is a prospective and retrospective observational study conducted
MATERIAL AND METHODS
measures.

INTRODUCTION
Blood bank and transfusion services collect, process, store and provide human blood intended for transfusion. Although, ideally blood transfusion is a safe process (i.e. that saves lives and improves the quality of life in a large range of clinical conditions), there are a number of risks associated with transfusion. Allogeneic blood for transfusion is a potential source of infection by a variety of known and unknown transmissible agents such as syphilis, diseases caused by Streptococcus spp., tuberculosis (TB), and human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and human T-cell lymphotropic virus (HTLV) infections [1]. Considerable efforts (National policies, improved donor selection and newer screening techniques) directed towards reducing transmissible pathogens have yielded a major reduction of viral agents especially in developed countries [2]. Given the reduction of viral transmission via allogeneic blood, the low but known risk of bacterial contamination has emerged as the greatest residual threat of blood transfusion [1]. Approximately 57% of all transfusion-transmitted infections and 16% of transfusion-related deaths have been associated with bacterial contamination [3]. In the United States, bacterial contamination of blood accounts for as many as 500 to 750 deaths annually [4], and bacterial contamination may be due to cutaneous bacteria followed by asymptomatic bacteremia in donors.

ABSTRACT
Despite considerable efforts directed towards reducing transmissible pathogens, transfusion transmitted bacterial infection remains one of the common cause of complications associated with transfusion. Reports from studies conducted in various countries are showing a high incidence of bacterial contamination of donor blood. There are no studies indicating the prevalence of bacterial contamination of blood and its components in Andhra Pradesh. In the present study an analysis of blood and blood component microbiological cultures in our tertiary care referral teaching hospital blood bank from January, 2015 to July,2018 was performed. A Total of 652 blood and blood component samples were submitted for bacterial and fungal culture. Out of which 20 (3.0%) samples were found to be positive for different bacterial agents. The probable cause for contamination may be due to cutaneous bacteria followed by asymptomatic bacteremia in donors.

KEYWORDS
Bacterial contamination, Whole human Blood, Blood Components, Bacterial culture.

RESULTS
A Total of 652 WB and blood component samples were submitted for culture for bacterial and fungal growth. Out of 2,608 cultures performed for these 652 samples (3 different temperatures for bacteria and one for fungi) 163 samples each are WB, PRBC, FFP, RDP respectively. Out of which 20 (3.0%) samples were found to be positive.

Out of 163 samples of each WB and blood component subjects for culture, culture positive rate of 13.8%±(7), 2.7%±(5), 2.7%±(5), 1.6%±(3) were found for PRBC, RDP, WB, FFP respectively in descending order of frequency. Staphylococcus was found to be the commensal organism cultured followed by Pseudomonas, Coagulase Negative Staphylococci (CONS), E Coli, Klebsiella, Micrococcici, Citrobacter in the descending order of frequency at various temperatures in blood and blood components(Table 1).

Table 1: List of bacteria detected after blood culture

<table>
<thead>
<tr>
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<th>Component</th>
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<td>4°C</td>
<td>CONS</td>
</tr>
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</tr>
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</tr>
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<td>CONS</td>
</tr>
<tr>
<td>6</td>
<td>WB</td>
<td>4°C, 22°C</td>
<td>Staphylococcus aureus</td>
</tr>
<tr>
<td>7</td>
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<td>CONS</td>
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<td>9</td>
<td>PRBC</td>
<td>22°C</td>
<td>Escherichia Coli</td>
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<td>4°C, 22°C</td>
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<td>37°C</td>
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Bacterial sepsis from a contaminated blood component is a rare but potentially serious complication of blood transfusion. Timely recognition and appropriate management of a septic transfusion reaction can be critical to the well-being of the patient. Knowledge of the prevalence of bacterial contamination of blood for transfusion and the sources or the causes of contamination is important for the planning and implementation of preventive measures at blood transfusion centres and the reduction of transfusion transmitted bacterial infections. The role of Transfusion Medicine fraternity is ever increasing in bacterial testing and usage of safe procedures during blood collection. Bacterial contamination and its associated transfusion infections can be reduced tremendously by careful screening of blood donors by questions related to bacterial and parasitic infections, careful preparation and blood products at donors' skin using improved skin disinfection methods and and using blood collection bags having diversion pouches.

DISCUSSION

Bacterial sepsis, septic shock or death, post transfusion detected in the present study. However in some studies, the risk of mortality from a bacterially contaminated red cell unit, at about 1 per million units, also exceeds the HIV transmission rate [6]. In the US, bacterial contamination is considered the second most common cause of death overall from transfusion (after clerical errors) with mortality rates for platelet-related sepsis ranging from 1:20,000 to 1:85,000 donor exposures [7].

Bacterial contamination was found to be prevalent in 3% of units tested in the present study. Similar studies conducted in different countries reported prevalence rates - Uganda 3.5% [8], Nigeria 8.8% [9], Kenya 7% [10], United States 0.2% [11], United Kingdom 0.15% [12] and in France 0.1% [13] (Table 2). The probable reasons for the difference of prevalence may be due to demographic, socio-economic status in different countries, protocols followed in various centres.

Table 2: Prevalence of bacterial contamination in Whole Human Blood and Blood Components abroad and in India

<table>
<thead>
<tr>
<th>S.No</th>
<th>Year of publication</th>
<th>Place</th>
<th>Author</th>
<th>Prevalence (in percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2000</td>
<td>Bordeaux, cedex, France</td>
<td>Perez P et al [13]</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>2001</td>
<td>Atlanta, Georgia, USA</td>
<td>Kuehnert MJ et al [12]</td>
<td>0.15</td>
</tr>
<tr>
<td>3</td>
<td>2002</td>
<td>All hospitals of UK, &amp; Ireland</td>
<td>Love EM et al [11]</td>
<td>0.2</td>
</tr>
<tr>
<td>5</td>
<td>2011</td>
<td>Ille-Ife, Nigeria</td>
<td>Bolarinwa AR et al [9]</td>
<td>8.8</td>
</tr>
</tbody>
</table>

In blood banking and transfusion medicine, our paramount concern is to improve transfusion safety for patients, in an attempt to achieve a zero-risk blood supply. Unlike other recent threats (existing or theoretical) to blood safety like transfusion transmissible viral infections, bacterial contamination still exists as a significant threat to blood supply and can cause life threatening complications like bacterial sepsis, septic shock. The role of Transfusion Medicine fraternity is ever increasing in bacterial testing and usage of safe procedures during blood collection. Bacterial contamination and its associated transfusion infections can be reduced tremendously by careful screening of blood donors by questions related to bacterial and parasitic infections, careful preparation of phlebotomy sites of donors' skin using improved skin disinfection methods and and using blood collection bags having diversion pouches.

LIMITATIONS OF THE STUDY

1. It is a single centre study.
2. The effect of duration of storage on blood culture positivity was not studied.
3. The reason for blood culture positivity could not be affirmed and the most probable cause based on the organism detected was mentioned.
4. Antibiotic sensitivity pattern was not performed.

CONCLUSION

Bacterial contamination due to Staphylococci remains a common occurrence during phlebotomy. The second probable cause for contamination may be asymptomatic bacteremia in donors.

REFERENCES


UK= United Kingdom, USA= United States of America

The commonest organism isolated in the present study is Staphylococcus aureus, despite the use of diversion pouche which decreases the contaminating cutaneous bacterial colonization in blood and blood components. The second probable cause being Gram negative organisms like Pseudomonas, E coli, Klebsiella which may be due to donor asymptomatic bacteremia. Similar reports were found in the BACTHEM study conducted within the French Hemovigilance Network, where in skin contaminant bacteria like Staphylococcus epidermidis, Propionibacterium acnes were the most common organisms identified [12]. In addition, in certain studies, high rate of drug resistance was observed for isolated bacterial strains in growths cultured from blood and blood components [14].

WB= whole human blood, PRBC= packed red blood cellcs, , FFP= fresh frozen plasma, RDP= random donor platelets, CONS= coagulase negative staphylococci