

# Vitamin D Deficiency in Patients with Sepsis

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## ABSTRACT

**Objective:** To determine the vitamin D deficiency in patients with sepsis.

**Study Design:** cross sectional study

**Place and Duration of Study:** This study was conducted at the at Tertiary Care Hospital Hyderabad / Jamshoro during July 2018 to December 2018.

**Materials and Methods:** The inclusion criteria were the patient of age  $\geq 18$  years along with any two or more of the mentioned components as (I) fever (II) increase heart rate (III) increase respiratory rate and (IV) increase or decrease total leukocyte count with 10% immature form while the exclusion criteria were pregnant and lactating women, patient already on vitamin D supplements or anti epileptic therapy, chronic liver / renal disease, malabsorption syndrome and the patients known case of malignancy and osteomalacia. The vitamin D levels were measured in all these patients at the time of admission or within 24 hours whereas each patient was followed till discharge or expired or left the hospital against medical advice and the outcomes was measures. The frequency and percentages were computed for categorical variables whereas the mean  $\pm$  SD was computed for numerical variables.

**Results:** During study period total fifty women of sepsis were recruited and studied had mean age  $\pm$  SD identified as  $55.54 \pm 7.63$  (yrs). Regarding gender the male and female population was observed as male 30(60%) and female 20 (40%), diabetes mellitus as 27 (54%), residence as urban 15 (30%), rural 35 (70%), type of infection as wound infection 30 (60%), abdominal infections 08 (16%) and soft tissue infections 12 (24%) while the sepsis severity as septic shock 11 (22%), severe sepsis 12 (24%) and sepsis 27 (54%) and outcomes as mortality 08 (16%), discharge from hospital 38 (76%), and left against medical advise 04 (8.0%) and vitamin d deficiency was detected in 35 (70%) patients with sepsis.

**Conclusion:** This study shown that the persons who have vitamin D deficiency are more prone to infection and sepsis and have higher mortality rate and poor outcome.

**Key Words:** Vitamin D, Sepsis and Septic shock

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## INTRODUCTION

Sepsis is Systemic Inflammatory Response Syndrome (SIRS) that has a proven or suspected microbial etiology leads to severe sepsis, septic shock and multiple organ failure requires intervention to table the homeostasis.<sup>1,2</sup> Despite clinical research during decades, the pathogenesis of sepsis and immune mechanism still not fully understood.<sup>3</sup>

However, the systemic exposure to microorganism leads to production of lipopolysaccharide which

generates complex and impaired the immune system.<sup>4,5</sup> The vitamin D is an important hormone and has active form which facilitates its biological properties by binding to receptor as vitamin D receptor (VDR) and increase the induction and production of antimicrobial peptides (AMP) and  $\beta$  defensin which act as body's front line defense against virus, bacteria, fungi and mycobacterial pathogen.<sup>6-8</sup> Thus, by keeping the hypothesis in mind, the study was designed to conducted on the patient hospitalized with sepsis and to explore the status of vitamin D level among such population at tertiary care teaching hospital Hyderabad / Jamshoro.

## MATERIALS AND METHODS

The cross sectional study was conducted during July 2018 to December 2018 at tertiary care hospital Hyderabad / Jamshoro. The inclusion criteria were the patient of age  $\geq 18$  years along with any two or more of the mentioned components as (i) fever (ii) increase heart rate (iii) increase respiratory rate and (iv) increase or decrease total leukocyte cunt with 10% immature form while the exclusion criteria were pregnant and

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lactating women, patient already on vitamin D supplements or anti epileptic therapy, chronic liver / renal disease, malabsorption syndrome and the patients known case of malignancy and osteomalacia. The patients with sepsis were evaluated with detailed history, clinical examination and routine hematological and biochemical laboratory investigations. The patients were categorized in sepsis, severe sepsis and septic shock according to reference definitions while the vitamin D levels were measured in all these patients at the time of admission or within 24 hours whereas each patient was followed till discharge or expired or left the hospital against medical advice and the outcomes was measures. The proforma was designed to collect the data and analyzed in SPSS 21 and the descriptive statistics were used to compute the study variables.

## RESULTS

**Table No.I: The clinical and demographical profile**

Parameter	Frequency (N=50)	Percentage (%)
<b>AGE (yrs)</b>		
18-29	03	6.0
30-39	10	20
40-49	12	24
50-59	13	26
60+	12	24
<b>GENDER</b>		
Male	30	60
Female	20	40
<b>DIABETES MELLITUS</b>		
Yes	27	54
No	23	46
<b>RESIDENCE</b>		
Urban	15	30
Rural	35	70
<b>TYPE OF INFECTION</b>		
Wound infection	30	60
Abdominal infections	08	16
Soft tissue infections	12	24
<b>SEPSIS SEVERITY</b>		
Septic shock	11	22
Severe Sepsis	12	24
Sepsis	27	54
<b>OUTCOMES</b>		
Mortality	08	16
Discharge	38	76
Left against medical advise	04	8.0
<b>VITAMIN D DEFICIENCY</b>		
Yes	35	70
No	15	30

During study period total fifty patients with sepsis were recruited and studied had mean age  $\pm$  SD identified as

55.54 $\pm$ 7.63 (yrs). The demographical and clinical profile of study population is presented in Table I.

## DISCUSSION

This study revealed the prevalence of vitamin D insufficiency among septic individuals.

Sudhir U, et al. Shown the incidence of sepsis was more in patients aged over 50 years (60%). The age distribution is consistent to the studies conducted around the world.<sup>9</sup> Martin, GS et al observed higher incidence of sepsis in subjects aged above 57 years. The mean age in an epidemiological study of sepsis was 54.9 years.<sup>10</sup> Agnus DC, et al shown that the incidence and severity of sepsis increases with age.<sup>11</sup>

Todi S, et al. found from a multicentre trial done at 12 centers in neighboring country that sepsis was more common among male population.<sup>12</sup>

Jeng L, et al. study shown that the vitamin D insufficiency was exists in 100% of critically ill subjects with sepsis, 92% of critically ill individuals without sepsis and 16.5% in healthy controls.<sup>13</sup>

Ginde AA, et al. observed in their study that serum vitamin D level less than 30 ng/ml were more likely to have severe sepsis.<sup>14</sup> The present study also consistent with the study done by Sudhir U, et al.<sup>9</sup>

According to Calandra T, et al. few common infection sites are responsible for sepsis were pneumonia, surgical wound and blood stream infection.<sup>15</sup>

Cecchi A, et al was identified that Vitamin D levels were low in septic population but lacks to consider it as a mortality predictor on multivariate analysis.<sup>16</sup>

## CONCLUSION

This study shown that the persons who have vitamin D deficiency are more prone to infection and sepsis and have higher mortality rate and poor outcome.

### Author's Contribution:

Concept & Design of Study: Siraj Ahmed Butt  
Drafting: Faheem Ahmed Memon, Muhammad Kashif Shaikh

Data Analysis: Santosh Kumar, Muhammad Hasnain, Abdul Ghani Shaikh

Revisiting Critically: Siraj Ahmed Butt, Faheem Ahmed Memon

Final Approval of version: Siraj Ahmed Butt

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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