

*Full Length Research Paper*

# A five-year review of necrotizing fasciitis at Jimma University Specialized Hospital, Jimma, Ethiopia

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**Necrotizing bacterial infections are extremely serious, fulminant infections of the soft tissues by virulent bacteria. The annual incidence of NF is estimated at 500–1,000 cases annually, and its prevalence globally has been reported to be 0.40 cases per 100,000 populations. It is seen to have a predilection for men, with a male-to-female ratio of 3:1. The disease affects all age groups. Clinical risk factors for necrotizing soft-tissue infection include diabetes mellitus, malnutrition, obesity, chronic alcoholism, peripheral vascular disease, chronic lymphocytic leukaemia, steroid use, renal failure, cirrhosis and autoimmune deficiency syndrome. The mortality associated with NSTI has been in the range of 16 to 45%. Necrotizing fasciitis is common in Ethiopia but the prevalence and risk factor patterns of the disease in Ethiopia setup have not been well studied. The main objective of this study was to assess pattern and outcome of necrotizing fasciitis in Ethiopia. A retrospective cross-sectional study design was conducted, by reviewing medical records of patients who developed necrotizing fasciitis during the period between January 1, 2011 and December 31, 2015 in Jimma University specialized hospital. Overall, 78 patients were diagnosed with necrotizing fasciitis and mortality rate was 19.23%. The mean age of patients was 36.33 years (range: 37 days to 80 years). Male to female ratio was 2.39:1. Seventy percent were from rural area and 39.7% had predisposing factor. The most common site affected is lower limb (39.7%) and the next common is perineum (34.6%). The median duration of hospital stay was 25.23 days. This five-year review has shown a low incidence of necrotizing fasciitis infection with a high mortality rate. Diabetes mellitus, RVI and malnutrition were identified as the main co-morbidities.**

**Key words:** Necrotizing fasciitis, diabetes mellitus.

## INTRODUCTION

Necrotizing fasciitis is less common than subcutaneous abscesses and cellulitis but are much more serious conditions whose severity may initially be unrecognized.

They typically involve deep subcutaneous tissue, superficial or deep fascia, or muscle, or any combination of the three (Dellinger and Anaya, 2007). Necrotizing

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**Table 1.** Socio-demographic characteristics of necrotizing fasciitis cases

variables		frequency	percent
Sex	Male	55	70.5
	Female	23	29.5
Age	0-14	9	11.5
	15-29	22	28.2
	30-44	18	23.1
	45-59	16	20.5
	>60	13	16.7
Address	Urban	23	29.5
	Rural	55	70.5

bacterial infections are extremely serious, fulminant infections of the soft tissues by virulent bacteria that have the ability, usually by the production of toxins, to cause widespread necrosis (Wittmann, 2000). Successful management of necrotizing fasciitis includes the following: early diagnosis, surgical debridement, anti-microbial therapy, intensive supportive care and hyperbaric oxygen (possibly) (Wittmann, 2000). With regards to necrotizing fasciitis of the extremities, the mortality rate is slightly lower than that recorded for abdominal and perineal infections. Patients with Fournier's gangrene that has not spread to the abdominal wall tend to have a better survival. As a general rule, without treatment, the mortality rate approaches 100% (Shaikh et al., 2012).

## MATERIALS AND METHODS

This was a five-year retrospective cross sectional study which was from January 1, 2011 – December 31, 2015 at Jimma University specialized hospital. All patients with necrotizing fasciitis seen in the study period were retrieved. All the data collection process was carried out with trained physician. Morbidity log book of department of surgery and operation log book were explored to find most of the necessary information including patient record numbers which was used to locate the individual patient card in the hospital record office. The data were collected using a structure questionnaire. 98 patient cards were identified and 78 were included in the study. The data was analyzed using SPSS for window version 20. Results were computed with graphs, tables and narratives based on the nature of data. Chi-square and p-value used to determine association between variables and p-value<0.05 was considered significant.

## RESULTS

There were 78 patients, out of which 55 were male and 23 were female with mean age of 36.33 years (an age range of 37 days to 80 years). Male to female ratio was 55:23. Almost, 71.8% (n=56) of the patients affected were

in the age group between 15 and 60 years. Seventy percent of people were from rural area (Table1). There was obvious predisposing factors in 39.7% (n=31) of the cases. Most common predisposing factor in the patients was perianal fistula and abscess, surgery and trauma. Painful swelling (71/78), skin necrosis (6/78), and fever (26/78) were the most presenting features (Table 2).

Of the 78 patients, 15.4% (n=12) had co-morbidities. These included diabetes mellitus and retro viral infection (6.4 and 3.8%, respectively). The most common site of infection was the lower limb and the next was perineum, 39.7 and 34.6%. Twenty five percent (n=20) of the patients had anemia at admission (Table 2).

All patients had surgical management. Eighty two percent of the patients underwent debridement. Multiple and limiting incision was performed for 14.1% patients but 3.8% required amputation of the limb. Sixty percent of patients required 2 or more debridement's until discharge from hospital. The median number of surgery required was 2 times. As a final procedure, skin graft was done for 33.3% of the patients (Table 3).

The median duration of stay in hospital was 25.5 days (range: 1 day to more than 2 months). Complication was presented in 21.8% of patients, in which the most common was MOF and wound infection. Fifteen of the 78 patients died with mortality rate of 19.23%. Independent variables were analyzed with the mortality rate of necrotizing fasciitis patients and there was no significant association between them (Table 3).

## DISCUSSION

During the five-year study period, 78 patients were treated for necrotizing fasciitis. The mean age of the patients was 36.33 years (range 37 days to 80 years) and male to female ratio in the study was 55:23. A study in Northern Ireland from 2007 to 2012 showed mean patient age of 59.4 years (range of 32-88) with a 25:21 male to female (Anaya et al., 2005).

In this study, 91% (71/78) of patients had painful swelling as clinical presentation which is similar to a study in Northern Ireland from 2007 to 2012, showing painful cellulitis (44/46), skin necrosis (26/46) were the most common presenting features (Anaya et al., 2005).

The most common infection site was the lower limb (39.7%) in the study which is dissimilar to a study done in Germany from 1996 to 2005, reporting that the most common site of infection was the trunk (42.3%) (Misiakos et al., 2014). Another study between 2007 and 2012 in Northern Ireland showed the lower extremity was the most commonly affected anatomical site (16/46) (Anaya et al., 2005).

Diabetes mellitus is the most common comorbid condition followed by RVI in the setup. In research done in New Zealand between 2000 and 2006, diabetes was the most frequent co-morbid condition, followed by obesity (Hodgins et al., 2015).

**Table 2.** Clinical condition and mode of presentation at admission

Variables		Frequency	Percent
Common clinical presentation	Painful swelling	71	91
	fever	21	26.9
	Ulceration	6	7.7
Predisposing Factor	Present	47	60.3
	Absent	31	39.7
Distribution of predisposing factors	Trauma	3	3.8
	Surgery	5	6.4
	Perianal fistula and abscess	6	7.7
	Snake bite	1	1.3
	Gangrenous hernia	1	1.3
	Infected hydrocele	1	1.3
	Injection	1	1.3
	Urethral stricture	1	1.3
	Medical illness	12	15.4
Co morbid disease	Present	12	15.4
	Absent	66	84.6
Distribution of co morbid disease	Diabetic mellitus	5	6.4
	Malnutrition	2	2.6
	RVI	3	3.8
	Other	2	2.6
Anatomic Site involved	Perineum	27	34.6
	Upper extremity	4	5.1
	Lower extremity	31	39.7
	Torso	15	19.2
	Other	1	1.3
Preoperative Anemia	Present	20	25.6
	Absent	58	74.4

The most common predisposing factors in this study were perianal fistula and/or abscess (7.7%, n=6), surgery (history of operation) (6.4%, n=5) and trauma (3.8, n=3). A study done in India from January 1995 to February 2005 showed history of operation (11.7%) was the most common predisposing factor (Adigun and Abdulrahman, 2004) (Table 2).

All patients underwent surgical treatment and the median number of surgery required was 2 times. Limb loss occurred in 9.7% patients with extremity involvement. The mortality rate was 19.23% (n=15) in this study which is similar to a study done in Northern Thailand where the mortality rate was 19.3% (Adigun and Abdulrahman, 2004) (Table 3). A study in Seattle, Washington from 1996 to 2006 reported the mortality rate was 16.9% and limb loss occurred in 26% of patients with extremity

involvement (Skaikh, 2006). A study done in India from January 1995 to February 2005 revealed 16% mortality and also a mean number of surgical debridement was 2.1 (Adigun and Abdulrahman, 2004). A research done in Taiwan from January 2003 to December 2009 showed 12% mortality (Anaya et al., 2009).

#### Limitation of the study

The data was a secondary data since the it was collected from patients chart and registration books, which was not completely documented. So, important data was not available.

The sample size was small which made it difficult to see the significance of some of the statistic.

**Table 3.** Type and frequency of surgical management and outcome.

<b>Variables</b>		<b>Frequency</b>	<b>Percent</b>
Types of surgical management	Multiple and limiting incision	11	14.1
	Amputation	3	3.8
	Debridement	64	82.1
Frequency of surgical management till discharge	1x	31	39.7
	2x	27	34.6
	3x	13	16.7
	4x	2	2.6
	5x	2	2.6
	6x	2	2.6
	>7x	1	1.3
Wound Closure	Skin graft	26	33.3
	Delayed primary closure	37	47.4
	Secondary closure	15	19.2
Total duration of hospital stay	1 week	11	14.1
	2 weeks	2	2.6
	3 weeks	18	23.1
	4 weeks	15	19.2
	5 weeks	7	9.0
	6 weeks	8	10.3
	7 weeks	1	1.3
	8 weeks	4	5.1
	>8 weeks	12	15.4
Post –operation complication	Present	17	21.8
	Absent	61	78.2
Distribution of post-operative complication	Wound infection	4	5.1
	Septic shock	2	2.6
	Multiple organ failure	6	7.7
	Hospital acquired pneumonia	3	3.8
	Respiratory failure	1	1.3
	Post-operative anemia	1	1.3
Condition At discharge	Improve	63	80.8
	Dead	15	19.2

## CONCLUSION AND RECOMMENDATIONS

This five-year review has shown a low incidence of necrotizing fasciitis infection with a high mortality rate of 19.23%. Diabetes mellitus, RVI and malnutrition were identified as the main co-morbidities. It is important to have prospective studies to examine the fitness and sufficiency of above variables as effective predictors of necrotizing fasciitis mortality. Emphasis must be placed on expert clinical diagnosis and judgment in order not to delay surgical treatment as well as use of the multi-disciplinary team.

## Conflict of interest

The authors have not declared any conflict of interest

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