



The Menace of Flesh-Eating Bacterial Infections in Human Health: A Case Study of Enugu East Senatorial Zone of Enugu State Nigeria.

by

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Abstract

Flesh-eating bacterial infection (also known as *necrotizing fasciitis*) caused by different bacterial groups is a disease that results in the death of the parts of the body affected. A close relative of the researcher with a type II diabetic immunosuppressed condition suffered from flesh-eating bacterial infection. Efforts to curb the spread of the infection with antibiotics were futile which led to the amputation of the affected body part and ultimately prompted the research work. The research was aimed therefore; at evaluating the general impact of the disease on human health, to ascertain the effects on immunosuppressed individuals, to determine the predominant type of infection in the designated area to know the prevalence among the people, as well as to raise awareness about the infection. Survey design was used in the research. The simple random sampling was used to select the sample. The instrument for data collection was structured questionnaires. The questionnaires were developed based on the objectives of the research work experienced. The result showed that out of 240 people examined 57(23.7%) were infected by flesh-eating bacterial infections with high prevalence on people 71-80 years old (53%) followed by 61-70 years (50%), 41-52 years (35%), 31-40 years (33%) while people between 10-30 years are very less infected. Out of the 57 individuals having the infections, 42(73.7%) were immunosuppressed. The screening result showed that 40(70%) out of the 57 infected individuals suffered from Type I, 17(30%) patients suffered from Type II while none were positive for Type III infection. 34(28%) out of 120 males examined have flesh-eating bacterial infection as against 23 (19.2%) out of 120 females examined. Therefore, from the results, Type I is the most predominant type of infection with noted higher rate in immunosuppressed individuals and people above 60 years. Though higher rate of the infection was found in males than in females, it is not very significant due to the low margin of difference. The contributions to knowledge from the research are: that diabetics showed significant correlation to flesh-eating bacterial disease, that inadequate diagnosis and treatment could lead to more advanced form of the disease.

Keywords: Menace, Flesh Eating Bacteria & Human Health

Introduction

Flesh-eating Bacterial Infection (also known as *necrotizing fasciitis*) caused by different bacterial groups is a disease that results in the death of the part of the body. It is a severe

disease of sudden onset that spreads rapidly (Wilson *et al.*, 2012). According to Matt (2014), flesh-eating disease is a severe bacterial infection with rapid evolution along the *fascial* planes and the involvement of

adjacent tissues accompanied by *toxico-septic* phenomena.

Typically, infection enters the body through a break in the skin such as a cut or burns. The early stage of flesh-eating infection is primarily characterized by symptoms of redness, swellings and pains in the affected area. It is not typically spread between people except in extreme unhygienic cases. The disease is classified into three types depending on the infecting organisms. These are: types I, type II and type III. Between 70 to 80% of cases involves type I; a polymicrobial infection. Type II is mostly caused by *Streptococcus pyogenes* and accounts for 20 to 30% of cases, while type III is rarely caused by *vibro vulnificus* of saline-water habit.

Many bacterial groups have been indicated as the causative organism of the infection. These include *streptococcus pyogenes*, *Escherichia coli*, *staphylococcus aureus*, *clostridium* species and so on. However, *streptococcus pyogenes* (or Group A streptococcus, GAS) is often identifies as the major cause of flesh-eating infections. *S Pyogenes* is mostly responsible for type II and Type I infections.

Flesh-eating bacterial infections is very hard to treat although there are several promising control methods and treatment procedures. *staphylococcus aureus* especially of MRSA (Methicillin- Resistant Staph Aureus) pose a lot of threats in the use of antibiotics for treatment. The number of cases reported for flesh-eating bacterial infection in adult is 0.40 per 100,000 people/ year. While incidence in children is reportedly higher at 0.08 cases per 100,000 people /year. The disease is considered a rare condition. However, the mortality rate remains high. Evidence has estimated the mortality rate to

20-40%, mainly on those who are immunosuppressed. According to the US center for Disease and Control there is an estimated 9,000 to 11,500 cases of the disease each year in the United State alone with a resultant 1,000 to 1,800 deaths annually (Becher *et al.*, 2017).

Statement of the Problem

A close relative of the researcher with a type II diabetic immunocompromised condition suffered from flesh-eating bacterial infection. Effort to curb the spread of infection with antibiotics was futile which lead to the amputation of the affected body part, and ultimately prompting the research work.

Objectives

- To evaluate the effects of the infection in human health
- To ascertain the impact on immunosuppressed individuals
- To determine the predominant type of flesh-eating bacterial infection in the area
- To know the prevalence of the disease among the people in the designated area.
- To raise awareness about the infection

Purpose of the Research

To examine the menace of flesh-eating bacterial infections among the people of the designated area

Research Questions

1. What is the prevalence of flesh-eating bacterial infections among the people in the area?
2. What is the prevalence of flesh-eating bacterial infections among immunosuppressed individuals in the area?

3. What type of flesh-eating bacterial infections are identified among the people in the Zone?
4. What is the prevalence of flesh-eating bacterial by sex?

Significance of the study

The significance of this study is to create awareness to the general public and draw the attention of the public health service about this disease and to get necessary information and solutions to it.

Research Design

The researcher used survey design to study the menace of flesh-eating bacterial infections in human health, in Enugu East Senatorial Zone of Enugu state Nigeria.

Population of study

The population was made up of people between the ages of ten to eighty years in Enugu East Senatorial Zone of Enugu state Nigeria.

Sampling Procedure

The simple random sampling was used to select the sample. The research sampled 240 people in Enugu East Senatorial Zone of Enugu state Nigeria.

Instrumentation

Research Question 1

What is the prevalence of flesh-eating bacterial infection among the people in the area?

Table 1: The prevalence of flesh-eating bacterial infection among people between the age of 10 to 80 years in the area.

| Age | No examined | No positive | % positive |
|----------|-------------|-------------|------------|
| 10-20yrs | 50 | 0 | 0% |
| 21-30yrs | 60 | 0 | 0% |
| 31-40yrs | 15 | 5 | 33% |
| 41-50yrs | 20 | 7 | 35% |

The instrument used for data collection was structured questionnaires, the questionnaires were developed based on the objectives of the research work experienced. The research adopted the closed end method Yes or No which is divided into two sections A and B. Section A of the questionnaire consist of personal data, section B consisted of research items contributing to the menace of flesh-eating bacterial infections among the people of Enugu East Senatorial Zone of Enugu state Nigeria.

Method of Data collection

The researcher personally administered the questionnaire to the respondents in Enugu East Senatorial Zone of Enugu state Nigeria. For proper understanding, the questionnaires were explained to the respondents in local dialects.

Method of Data Analysis

The method of data analysis used was simple percentages which were expressed in tables and charts.

Results and Discussion

The data collected were presented and analyzed. The different questions from the questionnaires were grouped together. The numbers that responded positively were noted with their corresponding percentages.

| | | | |
|--------------|------------|--------------------|-----|
| 51-60yrs | 25 | 10 | 40% |
| 61-70yrs | 40 | 20 | 50% |
| 71-80yrs | 30 | 16 | 53% |
| Total | 240 | 57 (23.75%) | |

The total prevalence of flesh-eating bacterial infections among the 240 people examined was 57(23.7%). As shown in Table 1, flesh-eating bacterial infection is most prevalent in people 71-80yrs old (53%,) followed by people of 61-70 years (50%), 41-50 years old (35%), 31-40 years old (33%), while people 10-30 years old are very less or not infected (0%).

Research Question 2

What is the prevalence of flesh-eating bacterial infections among immunosuppressed individuals?

Table 2: The prevalence of flesh-eating bacterial infections among immunosuppressed individuals.

| Immunosuppressed | No positive | No positive % |
|-------------------------|--------------------|----------------------|
| People who are obese | 8 | 19% |
| People with diabetes. | 22 | 52.4 % |
| Alcoholics | 12 | 28.6% |
| Total | 42 | 100% |

Table 2 shows that out of 57 people with flesh-eating bacterial infections, it was found out that 42 of them were immunosuppressed. As shown in table; diabetic patients accounts for 52.4% while, alcoholics and people who are obese accounts for 28.6% and 19% respectively.

Research Question 3

What types of flesh-eating bacterial infections are identified among the people in the zone?

Table 3: Types of flesh-eating bacterial infections identified among the 57 infected people.

| Type | No positive | % positive |
|--------------|--------------------|-------------------|
| Type I | 40 | 70% |
| Type II | 17 | 30% |
| Type III | 0 | 0% |
| Total | 57 | 100% |

Table 3 shows the types of flesh-eating bacterial infections associated with the 57 infected individuals. 40 (70%) were discovered to suffer from Type I, and 17 (30%) patients were infected with Type II, none of the patients screened were positive for Type III infection.

Research Question 4

What is the prevalence of flesh-eating bacterial infections among the people by sex?

Table 4: Responses on the prevalence of flesh-eating bacterial infections among people by sex

| Variation | No | No positive | % positive |
|-----------|-----|-------------|------------|
| Male | 120 | 29 | 50.9% |
| Female | 120 | 28 | 49.1% |
| Total | 240 | 57 | (23.75%) |

Table 4 shows that 29 (50.9%) out of 120 males examined have flesh-eating bacterial infection as against 28 (49.1%) out 120 females examined. In effect, flesh-eating bacterial infection is slightly more prevalent among males than females in Enugu East Senatorial zone of Enugu State Nigeria.

Discussion of Results.

Results showed that 57 (23.75%) out of 240 people involved in the study were positive for flesh-eating bacterial infection. 60-80 years old have high infection prevalence. This could be gradual attributed to depletion of the body vigor and the immune loss associated with old age. In contrast, those between 10-30 years show a remarkable resistance to the disease. This could be attributed to the fact that their body system is at the prime. The whole body tissues and systems are very active at this stage. This agrees with the findings that age is a predisposing factor to flesh-eating infections.

About 47 out of 57 individuals implicated in the infection were immunosuppressed. This agrees with the findings of Hackett Steven (2008), who reported that higher rate of flesh-eating bacterial infection is observed in those who are immunosuppressed or have similar conditions. 22 people (52.4%) out of the 57 immunosuppressed individuals are diabetic. This suggests high correlation between

diabetics and flesh-eating bacterial infection according to Heitman (2000), who worked on diabetic patients suffering from flesh-eating bacterial infections.

Similarly, alcoholics came second with 12(28%) patients. This agrees with the findings of Wang *et al* (2002), who in a study in Taiwan found that 35% of more than 40,000 patients subsequently developed flesh-eating conditions. This 35% were heavy alcoholics or have *cirrhosis* of the liver. His conclusion was that alcohol abuse or *cirrhosis* of the liver was a risk factor in developing flesh-eating bacterial infections. He further went on to suggest a number of reasons for a connection between flesh-eating disease and alcoholism. According to his findings, excessive alcohol consumption can reduce the body's resistance to bacterial infection; *cirrhosis* of the liver (as as result of alcohol abuse) can lead to the swelling of the legs which may cause a minor injury more likely, offering a rout of entry for bacteria. Again, *cirrhosis* induces immunosuppression as well as lead to Type II diabetics.

Obesity weakens the immune system. Heitman (2000), opined that obesity changes the body metabolism causing more fat molecules to be released in to the blood. This affects insulin function thus, high sugar level

leading to Type II diabetics. 8 (19%) people having flesh-eating infections were obese suggesting a connection to Heitman's findings.

Of the 240 people examined 40 and 17 of them were diagnosed with Type I and Type II infections respectively. There seems to be a higher prevalence of Type I and Type II in the population. These findings seem to correspond with Steven *et al* (2009), who reported that 70% to 80% of all cases are Type I infections while, Zackrisson *et al* (2008), attributed this to the very polymicrobial nature of Type I infection where many types of bacteria can be involved in the infection.

30% of all case was Type II caused predominantly by *Streptococcus pyogenes* which affect people with a history of injuries. *S. pyogenes* also contributes tremendously to Type I infection. There was no record of Type III infection in the study. These results are in agreement with previous studies that Type III is a very rare infection.

Infection prevalence among males and females showed that out of 120 males examined only 29 (50.9%) of males were positive for flesh-eating bacterial infections, while out of 120 females examined, 28 (49.1%) were positive for flesh-eating bacterial infections. It appears the infection is more prevalent among the males but the difference is at low rate. This agrees with previous research by Gulizia *et al* (2001) that sex did not affect immensely the prevalence among people.

Summary of Findings

From the above findings:

1. Type I is the most predominant type of flesh-eating infections among the people

2. Higher rate of infections occurs mostly in immunosuppressed individuals.
3. Diabetes is a leading immunosuppressed condition that can lead to flesh-eating bacterial infections.
4. The prevalence rate of flesh-eating bacterial infections in male is higher than that of female.
5. Age factor plays a major role in developing flesh-eating bacterial infections. The higher the age the more the chances of developing the infection and vice versa.
6. *Streptococcus pyogenes* is the most predominant species causing flesh-eating bacterial infections as it is implicated in both Type I and Type II infections.

Conclusion

From the information provided by this research it was revealed that immune suppressed individuals especially the ones induced by diabetics are more prone to developing flesh-eating bacterial infections in the area.

The study obviously showed that flesh-eating bacterial infection is still posing problems in Enugu East Senatorial Zone of Enugu State Nigeria. The prevalent rate is on the increase and very high prevalent rate of Type I infections were observed. Type I and Type II infections caused predominantly by *Streptococcus pyogenes* play a significant role in causing flesh-eating bacterial infections among the people in the area.

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