

Necrotizing Fasciitis of Spine: The knowledge of physicians in Saudi Arabia toward this rare condition

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Received: July 2022 Accepted: August 2022; Published: September 1, 2022.

Citation: Alshehri A. Mohammed. Necrotizing Fasciitis of Spine: The knowledge of physicians in Saudi Arabia toward this rare condition.. World Family Medicine. 2022; 20(9): 166-172. DOI: 10.5742/MEWFM.2022.9525158

Abstract

Background: Necrotizing fasciitis (NF) is an emergency condition which is rare and characterized by the rapid progressive infection of the soft tissue. This condition is mainly occurred at limb however, spine NF is rare and life-threatening condition. Adequate knowledge about these rare conditions could be helpful in earlier diagnosis and commencement of management which could reduce the complications of this disease and reduce its mortality rate. Thus, the aim of this study is to assess the level of knowledge of physicians in Saudi Arabia toward necrotizing fasciitis of the spine.

Methodology: This is cross-sectional study that was conducted among physicians of different regions of Saudi Arabia. This study depended on self-reported questionnaire that was distributed online through Google sheets over social platforms such as Facebook and WhatsApp. Online means of distribution was used in order to achieve a big sample from different regions of Saudi Arabia. The questionnaire was self-designed according to literature review.

Results: This study was conducted among 161 physicians where 59 % of them were males while 53.4 % of the participants were younger than 35-years-old. In general, 47.2 % of the physicians in this study had adequate knowledge considering NF. Age was a significant factor affecting the level of knowledge among the physicians ($P=0.0003$) where 62.7 % of the participants older than 35 years old had adequate knowledge compared with 33.7 % of those younger than 35 years old.

Specialty of the physicians is another significant factor affecting knowledge of the participants ($P=0.0001$) where those who were surgeons had the highest level of knowledge. Furthermore, in this study, we found that 34.8 % of the physicians reported seeing a case with NF before with those who reported seeing a case with NF showing higher level of knowledge significantly ($P=0.0001$).

Conclusion: We found that there is higher percentage of physicians who have inadequate knowledge regarding NF including spinal symptoms, especially among general practitioners. Urgent need to improve the awareness of physicians toward NF and other rare conditions is important in order to improve the early diagnosis of these conditions and starting medical intervention in earlier stages.

Keywords: Necrotizing fasciitis, knowledge, Saudi Arabia

Introduction

Necrotizing fasciitis (NF) is a condition that is a surgical diagnosis which is characterized by the rapid progressive infection of the soft tissue causing widespread tissue necrosis as well as related systemic disease and symptoms [1–3]. NF is one of the fatal soft-tissue infections that were reported with a high mortality rate that reached 76 % in some studies [4]. The surgical characteristics of the diagnosis of NF include superficial fascia, absence of pus and dishwasher-gray exudate [3]. Because the infection has a rapid progression, early recognition and application of aggressive surgical debridement are critical in order to reduce the mortality [5]. NF is shown in different bodily regions especially at extremities, and spine involvement is an extremely rare condition [5]. It is difficult to diagnose NF in early stages because the symptoms of this stage include pain at the site without evidence of infection. Thus, patients who have been treated with chronic pain at the same site may develop a differential diagnosis after disease progression [4].

NF is a limb related condition and considered one of the life-threatening surgical emergencies that requires emergent and aggressive medical care where most of these patients are managed in the intensive care unit [6]. Different terminologies are used to describe the condition of NF including hospital gangrene, acute dermal gangrene, streptococcal gangrene, Fournier's gangrene suppurative fasciitis and synergistic necrotizing cellulitis [7].

NF has been known as a terrible disease since the time of Hippocrates. By the end of the eighteenth century, Fournier reported a necrotic infection of the perineum and genital area which is known as Fournier gangrene. In 1952, Wilson described the condition as necrotizing fasciitis which is the preferred terminology in our days because it describes the most consistent and key features of the condition, the fascial necrosis. In general, necrosis means the death of a portion of the tissue while fascia is fibrous tissue that encloses the muscle [8].

Reasons for the emergency state of NF is its high morbidity and mortality where early debridement will have a significant favorable outcome. Therefore, NF is considered as a surgical emergency. Among patients with NF, 90 % of them will need intensive care and organ supportive therapy and up to 46 % of NF patients at extremities need limb amputation [6].

Risk factors associated with NF include diabetes mellitus which is considered the commonest risk factor. In a previous study, the authors reported that up to 57 % of patients with NF had diabetes mellitus [6]. Moreover, in another study, the authors found that 53 % of the patients with NF were diabetic patients, while other risk factors include hypertensive disorders in 25 % of the patients, cardiac diseases (15 %), chronic airway disease and brachial asthma in less than 10 % of the patients with NF [9]. Moreover, use of non-steroidal anti-inflammatory (NSAID) medications seems to have a significant correlation with development

of NF where a previous study showed a significant association between NF and use of NSAID (OR= 31.4, 95 % CI 6.4-15.3) [10]. Furthermore, another study showed that 50 % of patients diagnosed with NF had received NSAIDs before presenting to the hospital [9]. NSAIDs medications are known to suppress the cytoprotective effect of prostaglandins however, these medications are used for reducing the pain which prevents the patients from going to hospitals while the disease process is continued which results in late presentation to the hospital [9]. In this study, we aimed to assess the level of knowledge of physicians in Saudi Arabia toward necrotizing fasciitis of the spine.

Methodology

Study design and setting:

This is cross-sectional study that was conducted among physicians of different regions of Saudi Arabia. The study was conducted using a self-reported questionnaire which was distributed online.

Subjects:

- Inclusion criteria:

- In this study, we included all physicians working in Saudi Arabia
- Of both genders
- And agree to participate in this study

- Exclusion criteria:

- In this study, we excluded students, residents and other medical staff such as nurses
- University staff such as professors and students were excluded
- Those who did not agree to consent were excluded from the study

Tools and procedures of the study:

This study depended on self-reported questionnaire that was distributed online through Google sheets over social platforms such as Facebook and WhatsApp. Online means of distribution was used in order to achieve big sample from different regions of Saudi Arabia. The questionnaire was self-designed according to literature review. It consisted of three parts; part one was designed to assess the demographic factors of the participants such as age, gender, region, specialty, and experience. The second part consisted of questions that assessed the knowledge of the participants regarding the condition. For each question, one correct answer was provided as (Yes, No, I do not know). Correct answer was coded as 1 while incorrect answer and I do not know answers were coded as 0 and the score of the questionnaire was determined by summing the score of questions. The higher the score, the better the knowledge. Then, the participants were categorized as low knowledge and high knowledge where answering 60 % of questions or more was assessed as high knowledge. The third part was used to assess the prevalence of necrotizing Fasciitis of Spine by asking the participants if they had dealt with patients diagnosed with this condition. In order to assess the validity of the questionnaire, a pilot study among twenty participants was conducted.

Statistical analysis:

MS Excel was used for data entry, cleaning and coding of the data while SPSS version 26 was used for data analysis. Frequency and percent were used for describing of categorical variables while mean and standard deviation were used for ongoing variables. t test and chi test were used to assess the relation between knowledge and demographic factors. All statements were considered significant if p value is lower or equal to 0.05.

Results

In this study, we were able to collect data from 191 physicians who agreed to participate in this study however, 30 responses were excluded because of incomplete questionnaires, thus the final sample was 161 participants. Among the sample, 59 % of them were males while 53.4 % of the participants were younger than 35-years-old. Moreover, 22.4 % of the participants were from the northern region while 21.1 % were from the southern region. Furthermore, we found that 39.1 % of the participants were surgeons while 35.4 % were orthopedic physicians and 25.5 % were general practitioners. Among the participants 41.6 % of the physicians had experience of more than 10 years and 41.6 % had experience lower than 5 years (Table 1).

Among physicians in this study, 63.35 % of them knew the main definition of necrotizing fasciitis (NF) as rapid progressing, inflammatory infection of the fascia with the secondary involvement of skin, subcutaneous tissues and muscle. Moreover, 47.83 % of the participants did not know that the majority of NF is seen in extremities while spine involvement is extremely rare. Furthermore, 86.96 % of the physicians knew that NF is a life-threatening condition however, 32.3 % of them did not know that NF is a surgical emergency. Moreover, 67.7 % of the physicians knew that NF is associated with pain in the back and thus, the differentiation from back pain is difficult. Only 65.84 % of the physicians knew that diabetes is a risk factor for developing NF and 55.9 % knew that patients with NF present with systemic disorders while almost 70 % have a knowledge considering LRINEC score. Moreover, 64.6 % of the physicians knew that imaging techniques are important in diagnosis of NF while 67.7 % knew that bold early surgical debridement is essential for treating of NF (Table 2).

In general, 47.2 % of the physicians in this study had adequate knowledge considering NF with ability to recognize more than 60 % of the questions correctly while 52.8 % of the participants had inadequate knowledge considering NF (Figure 1).

In this study, we did not find any significant difference between genders considering level of knowledge ($P=0.962$) where 47.4 % of male and 47.0 % of female participants had adequate knowledge. Age was a significant factor affecting the level of knowledge among the physicians ($P=0.0003$) where 62.7 % of the participants older than 35 years old had adequate knowledge compared with

33.7 % of those younger than 35 years old. Specialty of the physicians is another significant factor affecting knowledge of the participants ($P=0.0001$) where those who were surgeons had the highest level of knowledge (65.1 % of them had adequate knowledge) followed by orthopedic physicians (50.9 % of them had adequate knowledge) while only 14.6 % of general practitioners had adequate knowledge. The more years of experience was significantly associated with better knowledge ($P=0.0001$), where 74.6 % of those with experience of more than 10 years had adequate knowledge compared with 57.1 % of those with 5-10 years of experience and 14.9 % of those with less than 5 years of experience (Table 3).

Furthermore, in this study, we found that 34.8 % of the physicians reported seeing a case with NF before while 26.7 % of the participants reported seeing less than two cases and 8.1 % 2-5 cases with NF. Those who reported seeing a case with NF showed a higher level of knowledge significantly ($P=0.0001$) and the more cases dealt with by the physicians, the higher the level of knowledge they had. Finally, 88.8 % of the participants reported that thought that they are able to deal with case of NF and those showed a higher level of knowledge (Table 3).

Table 1: The demographic factors of the participating physicians

Gender	Male	95	59.0 %
	Female	66	41.0 %
Age	< 35	86	53.4 %
	> 35	75	46.6 %
Residency	Northern region	36	22.4 %
	Western region	32	19.9 %
	Southern region	34	21.1 %
	Central region	29	18.0 %
	Eastern region	30	18.6 %
Specialty:	General practitioner	41	25.5 %
	Surgeon	63	39.1 %
	Orthopedic physicians	57	35.4 %
Experience:	< 5 years	67	41.6 %
	5-10 years	28	17.4 %
	> 10 years	67	41.6 %

Table 2: The knowledge of the physicians considering necrotizing fasciitis

Item	TRUE		Wrong/I do not know	
	Count	Percent	Count	Percent
Necrotizing fasciitis(NF) is a rapidly progressing, inflammatory infection of the fasciawith the secondary involvement of skin, subcutaneous tissues and muscle	102	63.35 %	59	36.65 %
The majority of NF is seen in extremities. Spine involvement is extremely rare	84	52.17 %	77	47.83 %
NF is life- threatening condition	140	86.96 %	21	13.04 %
NF needs surgical emergency	109	67.70 %	52	32.30 %
NF is not associated with pain at the back and could be differentiated from back pain	109	67.70 %	52	32.30 %
Diabetic patients have higher risk of development of NF	106	65.84 %	55	34.16 %
Patients with NF will be presented with systemic disorders	90	55.90 %	71	44.10 %
Do you know about LRINEC score?	112	69.57 %	49	30.43 %
Imaging technique is not important in diagnosis of NF	104	64.60 %	57	35.40 %
Bold early surgical debridement is not essential for treatment of NF	109	67.70 %	52	32.30 %

Figure 1: The distribution of physicians according to their knowledge considering NF

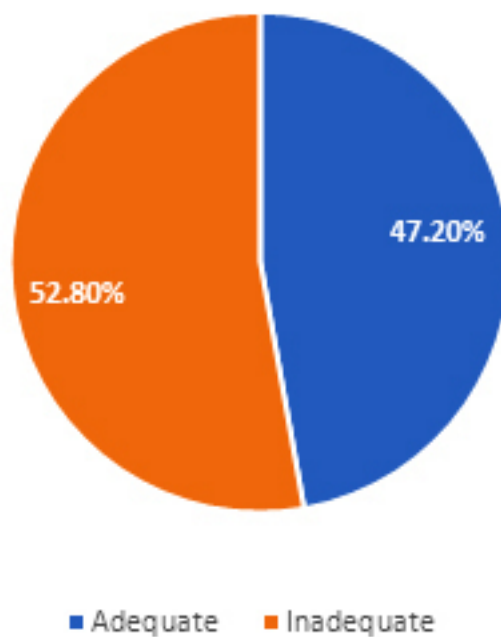


Table 3: The relation between demographic factors and level of knowledge

Item		Adequate		Inadequate		P-value
		Count	Percent	Count	Percent	
Gender	Male	45	47.4	50	52.6	0.962
	Female	31	47.0	35	53.0	
Age	< 35	29	33.7	57	66.3	0.0003*
	> 35	47	62.7	28	37.3	
Residency	Northern region	17	47.2	19	52.8	0.316
	Western region	15	46.9	17	53.1	
	Southern region	16	47.1	18	52.9	
	Central region	14	48.3	15	51.7	
	Eastern region	14	46.7	16	53.3	
Specialty:	General practitioner	6	14.6	35	85.4	0.0001*
	Surgeon	41	65.1	22	34.9	
	Orthopedic physicians	29	50.9	28	49.1	
Experience:	< 5 years	10	14.9	57	85.1	0.0001*
	5-10 years	16	57.1	12	42.9	
	> 10 years	50	74.6	17	25.4	
Do you see a case with NF before?	Yes	49	87.5	7	12.5	0.0001*
	No	27	25.7	78	74.3	
How many cases of NF, have you ever deal with?	0	27	25.7	78	74.3	0.0001*
	< 2	37	86.0	6	14.0	
	2--5	12	92.3	1	7.7	
Do you think that you are able to deal with case of NF?	Yes	74	51.7	69	48.3	0.000*
	No	2	11.1	16	88.9	

Discussion

Necrotizing fasciitis is a rare surgical emergency. However, antibiotics, resuscitation and critical care are important; surgical debridement remains the life saving therapy. Delay in the diagnosis and surgical management of these infections increases the mortality significantly [11–13]. Assessment of knowledge of physicians of rare conditions is important. Adequate knowledge about these rare conditions could be helpful in earlier diagnosis and starting of the management which could reduce the complications of these diseases and reduce its mortality. This is important as in our condition under investigation, early diagnosis and treatment are critical. Up to our knowledge, there is no previous study that was conducted to assess the knowledge of physicians toward such rare condition. There is a huge gap in our understanding regarding the knowledge of physicians about necrotizing fasciitis of spine. Thus, the aim of this study was to assess the level of knowledge of physicians in Saudi Arabia regarding necrotizing fasciitis of spine.

Many previous studies showed that physicians had lower knowledge and inadequate awareness of rare diseases which are not presented frequently among them [14–17]. Rare medical conditions are generally defined as serious, life-threatening and chronic conditions which affect a small percentage of the general population [18]. However, each rare condition is associated with varied problems experienced by the patients, their families and caregivers. One of the most common issues associated with these rare conditions that prevent the patients from achieving better quality of management and quality of life is the difficulty in the diagnosis [15,19]. Misdiagnosis or delayed diagnosis can result in the deterioration of the symptoms and progression of the rare disease which results in inappropriate medical intervention and additional medical costs [14,15,19]. Our results confirm this fact where only 47.2 % of the physicians in this study had adequate level of knowledge regarding NF of the spine. This indicates the importance of increasing interest in providing the physicians with improved information of the rare conditions including NF in order to improve the ability of these physicians in correct and timely diagnosis of these conditions. Most of the previous studies considering rare conditions, reported that dealing with these rare conditions is associated with higher knowledge among the physicians where dealing with patients with difficult and persistent symptoms require the physicians to search for new information considering these symptoms [15–17,20]. This is confirmed using our data which showed that physicians who reported dealing with previous cases reported the highest level of knowledge where increasing the rate of the condition is associated with even better knowledge. One recommended solution of inadequate knowledge of NF and other rare conditions is good communication between the physicians themselves, in the hospital and within different hospitals which will help in facilitating the process of transferring information between doctors, especially those who have faced these cases of patients with rare diseases, with recommendations on how to diagnose, and treat and the consequences.

NF is surgical condition; thus, it is not surprising that surgeons had a higher level of knowledge considering NF than other specialties. However, our data showed shocking information considering that only 14.6 % of general practitioners had adequate knowledge. General practitioners were the first physicians who deal with patients in emergency departments [21–23] and low level of knowledge indicates that the delay in diagnosis is highly possible.

This study included some limitations including depending on self-reported questionnaire which may lead to some personal bias where some participants may not be very honest in completing the questionnaire. Moreover, depending on online means of distributing of the questionnaire may lead to some sampling bias toward younger participants. On the other hand, this study was able to provide a validated tool to assess the knowledge of the physicians considering one of the rare conditions of NF with Cronbach's alpha of 0.735 which is considered a good score and considered a reliable questionnaire. In conclusion, we found that there is higher percentage of physicians who have inadequate knowledge considering NF including spinal symptoms, especially among general practitioners. Urgent need to improve the awareness of physicians toward NF and other rare conditions is important in order to improve the early diagnosis of these conditions and starting of medical intervention in earlier stages.

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