

Prevalence of Skin and Soft Tissue Infections in Diabetic Patients in a District Headquarters Hospital of, Pakistan

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ABSTRACT

Diabetes has become the most prevalent endocrine disorder as it has continued to increase. Diabetes mellitus cases are remarkably increasing in our country every year. Diabetes is characterized by a pathophysiology that leaves diabetic patients more prone to infection and to developing skin and soft tissue infections that are more complicated. The risk of infection is increased in diabetic patients, and their mutation potential is detrimental, resulting in a higher morbidity and mortality rate than in the general population. Infections of the skin and soft tissues (SSTIs) involve microbial invasions, and they differ in presentation and severity. A total 445 participants 15 to > 40 years of age participated in this study. Out of total respondent, 48.53% and 51.46% were male and female, respectively. Among the total, the highest percentage of the respondent were around 36- 40 years old 52 (22.70%) followed by 31-35 years old 44 (19.65%), 26-30 year old (13.27%), > 40 years old (13.10%), 21-25 years old 29 (12.66%), 16-20 years old 23 (12.04%) and 10-15 years old 20 (8.73%). Out of total 216 males, 179 (82.87%) were infected with soft and tissue infection while out of total 229 females, 206 (89.95%) were infected with soft and tissue infection. Overall prevalence of soft and tissue infection in patients of diabetic mellitus was 86.51%. The maximum respondent belonged to rural areas while minimum respondents from urban areas. 37.66% mild level of exercise was recorded in diabetic patients followed by 25.71% moderate level, and 19.74% heavy level of exercise recorded. Only 16.88% of patients recorded no level of exercise. Majority of respondents used oral medications (51.63%) followed by insulin (47.62%), do exercise (15.76%) and use nutritious food or fruits (9.59%). The study concluded that patients with poorly controlled and uncontrolled blood glucose levels were more likely to develop skin and soft tissue infections. In order to achieve favorable postoperative outcomes, it is essential to make fast and case-adapted therapeutic decisions, as well as to observe the patient's general condition and his wound on a daily basis.

Keywords: Diabetes

INTRODUCTION

A clinical syndrome known as diabetes mellitus (DM) is characterized by inadequate insulin secretion or action. It is regarded as one of the biggest new health dangers in the twenty-first century. In 2025, there will likely be 380 million people who have DM (Leong et al., 2018; Greenhalgh, 2015). In addition to the typical side effects of the illness, DM has been linked to abnormalities in humoral immunity, neutrophil function, and T cell responsiveness. As a result, DM makes a person more vulnerable to infections—both common diseases and those that virtually invariably only affect persons with DM (Esposito et al., 2016, 2019; Loannou et al., 2018; Mohan et al., 2016).

The most common causes of illness and occasionally fatality in people with diabetes mellitus are skin and soft tissue infections (SSTIs). Infections of the skin and soft tissues are frequent in diabetics. Typically, trauma, pressure, ischemic lesions, or disruption of the skin barrier cause diabetic foot infection. These wounds might spread an infection to nearby soft tissue or deeper bone tissue, or they might become secondary infections (Polk et al., 2021; Poulakou et al., 2019; Storandt et al., 2022). SSTIs are a primary cause of hospitalization and are more prevalent and severe in diabetic individuals than in non-diabetic people. Individuals with diabetes have a risk of SSTI-related hospitalization that is more than twice as high as that of patients without diabetes (DiNubile and Lipsky, 2004; Falagas et al., 1996; Burnham et al., 2016; Pulido-Cejudo et al., 2017).

Diabetes is independently linked to more SSTI-related visits to the ER, longer hospital stays, and infection-related mortality. Diabetes-related SSTIs are predicted to increase in frequency among hospitalized patients due to the increased prevalence of the disease. SSTIs can affect any anatomic region, however diabetes people are more likely to experience them in the foot. SSTIs impact between 7-10% of hospitalized patients, and they are highly prevalent in the emergency care setting. The ecology of organisms on the skin is incredibly complex and can lead to illness. There is need to determine the prevalence of SSTIs in diabetic patients in

the country because, before this study, no such study has conducted.

MATERIAL AND METHODS

Study period and data collection: The current cross-sectional study was the conducted in district headquarters (DHQ) hospital. The time frame for this study was March 2019 to March 2020. All patients with diabetes who are admitted to this hospital will make up the study population. Data were gathered using a semi-structured interview questionnaire that had been pretested and included both open-ended and closed-ended questions. The questionnaire was used during a face-to-face interview. Each question was fully explained to respondents in their native tongue.

Statistical analysis: The data were analyzed using Statistical Package Software for Social Sciences (SPSS) 22.0 version. The obtained data were analyzed using logistic regression, Chi-square (2), frequency and percentage ratios, and other methods.

RESULTS AND DISCUSSION

A total 445 participants participated in this study. Out of total respondent, 216 (48.53%) and 229 (51.46%) were male and female. In the study 15 to > 40 years of participants were involved and among them the highest percentage of the respondent were around 36- 40 years old 52 (22.70%) followed by 31-35 years old 44 (19.65%), 26-30 year old (13.27%), > 40 years old (13.10%), 21-25 years old 29 (12.66%), 16-20 years old 23 (12.04%) and 10-15 years old 20 (8.73%). The maximum respondent belonged to rural areas while minimum respondents from urban areas (Table 1). Out of total 216 males, 179 (82.87%) were infected with soft and tissue infection while out of total 229 females, 206 (89.95%) were infected with soft and tissue infection. Overall prevalence of soft and tissue infection in patients of diabetic mellitus was 86.51% as shown in figure 1.

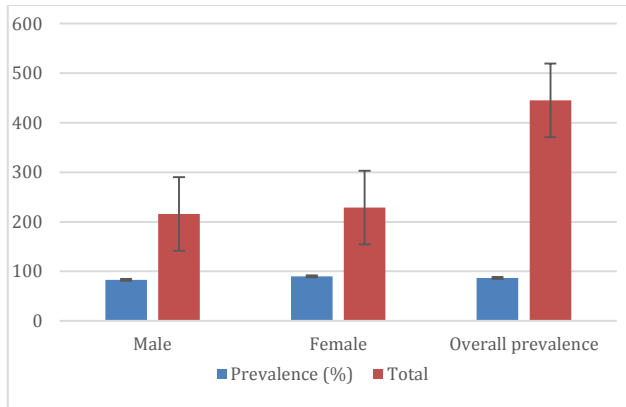


Figure 1: Sex wise prevalence of soft and tissue in patients of diabetic mellitus.

Table 1: Demographic characters of respondents.

Variables	Number of male	%	Number of female	%
Age (years)				
10-15	16	7.4	20	8.73
16-20	26	12.03	23	10.04
21-25	27	12.5	29	12.66
26-30	33	15.27	31	13.27
31-35	40	18.51	44	19.65
36-40	49	22.68	52	22.7
> 40	25	11.57	30	13.1
Total	216	100	229	100
Marital status				
Single	67	31.01	73	31.87
Married	149	68.98	143	62.44
Total	216	100	229	100
Educational level				
Illiterate	18	8.33	24	10.48
Primary	30	13.9	34	14.84
Middle	73	33.8	79	34.49
Matric	41	18.98	45	19.65
FSC	20	9.25	17	7.42
University	34	15.74	30	13.1
Total	216	100	229	100
Social class				
Upper class	23	10.64	29	12.66
Middle class	70	32.4	72	31.44
Lower class	123	56.94	128	55.89
Total	216	100	229	100
Occupation				
Farming	91	42.12	88	38.42
Teaching	69	31.94	81	35.37
Business	35	16.2	31	13.53
Student	21	9.72	29	12.66
Total	216	100	229	100
Residency				
Urban	95	43.98	110	48.03
Rural	121	56.01	116	50.65
Total	216	100	229	100
Religion				
Muslim	108	50	225	98.25
Christian	6.00	2.77	3.00	1.31
Hindu	2.00	0.92	1.00	0.43
Total	216	100	229	100

In the current study, 37.66% mild level of exercise was recorded in diabetic patients followed by 25.71% moderate level, and 19.74% heavy level of exercise recorded. Only 16.88% of patients recorded no level of exercise. Other study showed that 73.6% population not found infected with soft and tissue infection while only 26.4 % found infected (Table 2). In our current study 86% population found infected. There is little difference in findings between the current study and previous studies. This difference

may be due to various factors especially size of population, location, age of patients, and method of data collection.

Table 2: Level of exercise among the soft and tissue infected patient admitted in hospital.

Level of exercise	Frequency (n)	%age
Mild	145	37.66
Moderate	99	25.71
Heavy	76	19.74
No	65	16.88
Total	385	100

Table 3: Types of skin disease in diabetic patients admitted in hospital.

Type of skin disease	n	%age
Ulcer	67	16.88
Color change	106	27.53
Itching	111	28.83
Scaling	101	26.23

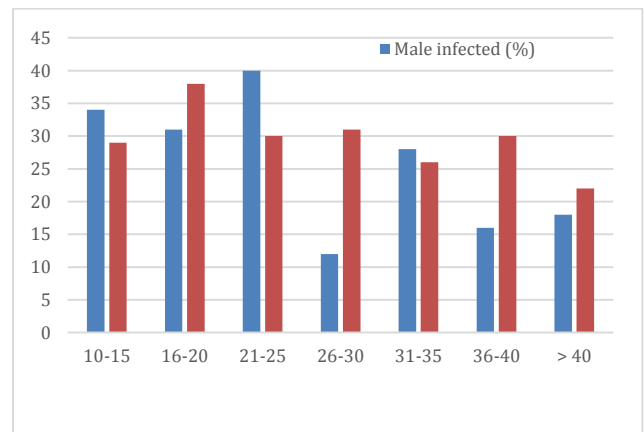


Figure 2: Age wise prevalence of soft and tissue infection in diabetic patients.

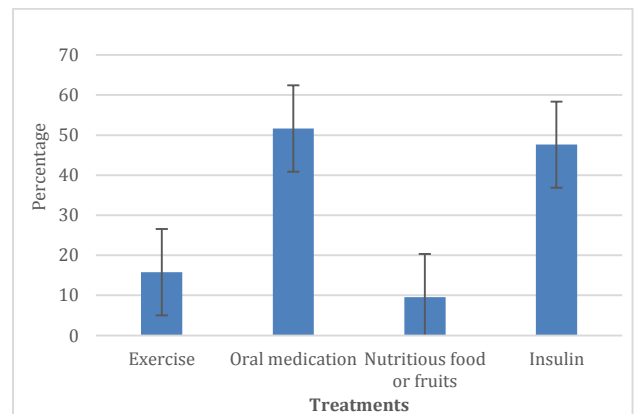


Figure 3: Methods used to manage the diabetic mellitus

In the current study, 21-25 years of patients had highest infection of soft and tissue. Maximum infestation was recorded in female than male as shown in figure 2. Specific risk factors may exacerbate SSTIs and influence their origin, course of illness, and response to particular treatments. It has not been demonstrated that the existence of SSTI risk factors correlates with the severity of the disease. Risk elements can be divided into two groups. First, there are patient-related factors, which may increase the risk of disease or affect the prognosis. Critical illness, advanced age, immune system impairment, liver and kidney disease, and vascular (particularly lymphatic or venous) insufficiency are risk factors in this category (Eron et al., 2003; Björnsdóttir et al., 2005). Additionally, a number of patient-related risk factors may be linked

to a worse prognosis, a faster rate of illness progression, a slower rate of recovery, as well as a higher rate of pathogen resistance.

Different methods have been used to control diabetic mellitus in patients throughout the globe. In the current study area, majority of respondents used oral medications (51.63%) followed by insulin (47.62%), do exercise (15.76%) and use nutritious food or fruits (9.59%) as shown in figure 3. Many other scientists had reported the similar findings (Khan et al., 2021; Lumbers, 2018). According to their investigations, oral medication is the excessively used method in the management of diabetic mellitus. The main causes of diabetic mellitus are shown in figure 4.

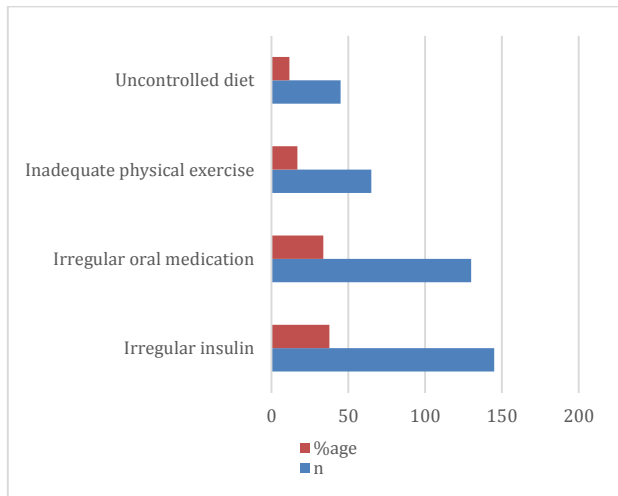


Figure 4: Major causes of soft and tissue infection in diabetic patients.

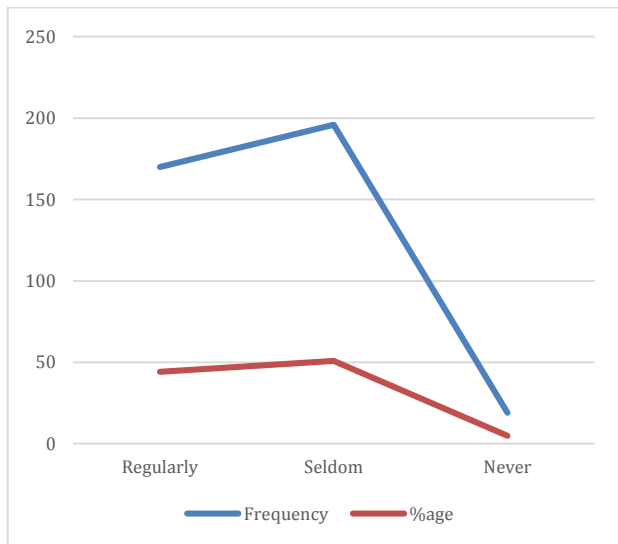


Figure 5: Visit to physician for disease treatment in the study area.

It was observed that majority of respondent responded that they visit seldom to nearby physician for the treatment of disease. Only 4.93% respondents never visited to any physician for the diagnosis or treatment as shown in figure 5. The medicine prescribed by the physician to patients who visited them were antibiotic (29.24%), antifungal (42.09%), antiviral (21.61%), and antiparasitic (7.06%). According to the report of Khan et al. (2021) and Shrestha et al. (2015), majority of responders (37.3%), followed by 17.4% who took antibacterial drugs, 8% who used antiparasitic drugs, and 1.7% who took antiviral drugs. Types of soft and tissue infection in diabetic patients are shown in figure 6.

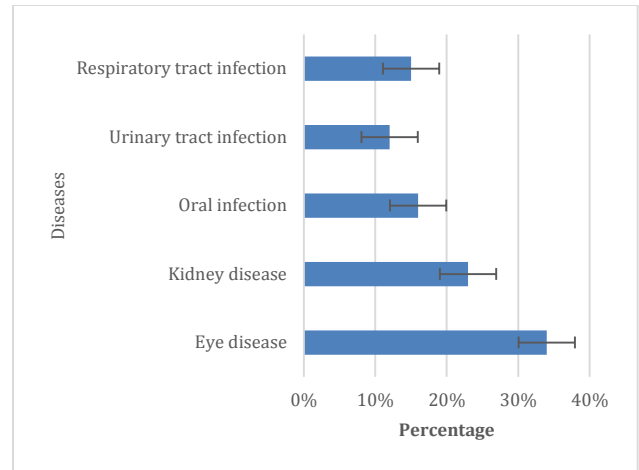


Figure 6: Type of soft and tissue infection in diabetic patient.

The diagnosis is very necessary for the treatment of diabetic patients, so proper diagnosis is needed to treat this contagious disease in the world. Among the respondent the highest percentage of the respondent's sufferings from type- 2 diabetic mellitus and type- 1 diabetic mellitus about 201 (52.20%), and 184 (47.79%), respectively, while only 1% sufferings from other specific causes. Lauder and Binienda (2005) and Balakrishnan and Appalasamy (2016) had reported the similar findings.

CONCLUSION

There are several chronic diseases that cause death worldwide, including diabetes mellitus. This disease has several complications, but the main one is the burden. Among the most common complications of this disease are infections of the skin and soft tissues. Several risk factors for soft tissue infections have been identified in diabetic patients in the current study, with significant correlations between some of these factors and the severity of infection, as determined by the extent and depth of the infection (skin, fascia, muscles). The risk for a necrotizing infection among male diabetic patients with a soft tissue infection of uncertain severity is higher than that of no-necrotizing infections. A correlation between the patient's age, diabetes duration, artery disease, and soft tissue infection is evident but not statistically significant.

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