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RESEARCH ARTICLE

Prevalence of diabetic septic foot, its related complications, and the level of awareness about diabetic foot care among diabetic patients in Hail.

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Abstract

Background: Diabetes mellitus (DM) is one of the most prevalent diseases in Saudi Arabia. Diabetic septic foot is one of its major complications. Better chances and fewer complication rates can be achieved by adopting appropriate prevention strategies. As the early detection of cases will very much contribute to reducing the magnitude of the problem, increasing the patients' awareness becomes a priority.

The objectives of this study are to investigate the prevalence of diabetic septic foot, and to assess the rate of occurrence of its complications among diabetic patients in Hail city in Safar- Rabea Alawal 1433 A.H. We also aim to evaluate the level of awareness of diabetic patients about the proper care of diabetic foot.

Methods: A cross sectional facility based study used in interviewing 96 diabetic patients attending the diabetic clinic in King Khalid Hospital in Hail in Safar- Rabea alawal 1433 A.H. Data analyzed using SPSS software.

Results: 37.9% of the interviewed patients have history of foot ulcers while 11.5% undergone lower limb amputation. 80% were aware of their foot ulcer risk and of the importance of foot care.

Conclusion: Findings showed high prevalence of foot ulcers and lower limb amputations among the studied group. Increased awareness levels were significantly related to the history of foot ulcers.

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Introduction:-

Diabetes mellitus (DM) is a chronic metabolic disorder. The World Health Organization expects the number of diabetics to increase by 2025, even up to 300 million people worldwide.

The Kingdom of Saudi Arabia is one of the top countries in the prevalence of diabetes. A previous study showed that the incidence of the disease was 17.3% in men and 12.18% in women. Number of patients in Saudi Arabia has increased from 4% to 17% between the years of 1984 to 1994, and reached up to 18% in 1998. At the year 2005 it has exceeded 20%. The prevalence of DM in Saudi Arabia is one of the highest reported in the world with an overall prevalence of DM in adults in KSA is 23.7% reported. Diabetes in Saudi Arabia, take 4 to 5.5% of the budget of the Ministry of Health.

Foot infections are the most common problems in persons with diabetes because of their compromised vascular supply. Local trauma and/or pressure, in addition to microvascular disease, may result in various diabetic foot infections that run the spectrum from simple, superficial cellulitis to chronic osteomyelitis. Foot infections in diabetics cause substantial morbidity and frequent visits to health care professionals and may lead to amputation of a lower extremity. Diabetic foot complications include neuropathy, skin changes, cellulites, and foot ulcers.

Risk factors for developing diabetic foot lesions include older age, gender as males are at higher risk, belonging to certain racial groups, longer duration of diabetes, other diabetes related complications, poor blood glucose control in addition to smoking,

The rising prevalence of diabetes all over the world has brought with it an increase in the number of lower limb amputations performed as a result of the disease. There is an amputation every 30 seconds somewhere in the world and 40 to 70% of amputations are due to diabetes. About six to eight percent of diabetic patients lose their limbs due to lack of good care. This problem is more common in the Arab world's due to lack of awareness.

The key to a future reduction in the incidence of diabetic foot ulceration is the setting up of a foot care team, the most important member of which are the patients, who must be convinced that regular foot care will reduce their chances of developing ulceration and other catastrophic consequences, such as amputation.

The strategy for managing diabetic septic foot lies in its prevention. Indeed, the early detection of risk factors, the triad of neuropathy, vasculopathy and immunopathy, are key components in the overall management of diabetic foot disorders and amputation prevention programs.

The diabetic patients are advised to comply to the following national guidelines which include dietary restriction, exercise regime, measuring HbA1c levels quarterly, capillary blood glucose monitoring regularly, obtaining a creatinine level yearly, foot screening yearly and renal and eye screening yearly according to the Ministry of Health Guidelines for Diabetes 2006.

Problem statement and Research Justification:-

- ❖ Diabetes mellitus is one of the most prevalent diseases in Saudi Arabia with data showing significant increase in the prevalence of diabetes mellitus recently.
- ❖ Diabetic septic foot is one of the major complications of DM. It's a common disabling problem and frequently leads to amputation of the leg.
- ❖ Approximately 15% of all diabetic patients are at risk of foot ulcerations during their life time, and 70% of their healed ulcers are estimated to recur within 5 years
- ❖ The knowledge, attitudes and practice of proper foot care among diabetic patients in Hail State is unknown.
- ❖ The research is conducted among diabetic patients attending the diabetic clinic. As they represent a reachable group they can act as a focal group to increase the awareness of the rest of the population in the State if properly educated.
- ❖ The findings of this study can be used for future planning of health education programs on the investigated areas.

Study Objectives:-

General objective:-

To investigate the prevalence of diabetic septic foot, its related complications, and the level of awareness about diabetic foot care among diabetic patients at King Khalid Hospital, Hail during Safar 1433 A.H.

Specific objectives:-

- 1) To measure the prevalence of diabetic septic foot among diabetic patients attending the diabetic outpatient clinics at King Khalid Hospital.
- 2) To assess rate of occurrence of diabetic septic foot complications among diabetic patients attending the diabetic outpatient clinics at King Khalid Hospital.
- 3) To evaluate the level of awareness of diabetic patients attending the diabetic outpatient clinics at King Khalid Hospital about the proper care of diabetic foot

Methodology:

Study design:-

Cross-sectional facility-based study design

Study Area:-

King Khalid Hospital is the major public hospital in Hail State and is located in Hail city which the capital of the state. It is the major referral hospital for tertiary medical care in the area. It provides educational opportunities to the medical students, nursing students and paramedical careers training.

Study population:-

All diabetic patients attending the diabetic outpatient clinics during the data collection period in King Khalid Hospital.

Sample size:-

Required sample size calculated based on a confidence level of 95% ($z = 1.96$), expected proportion from a similar study in Kenya was 4.6% (we could not get diabetic septic foot estimated prevalence in the KSA), an accepted error of 5%. Then using the equation: $s = \frac{z^2(p(1-p))}{e^2}$, $s = 67.428$ therefore. **68** patients.

Depending on the diabetic clinics statistical records, it was expected to get this sample size in few days to one week of total outpatients' attendants' coverage.

Sampling procedure:-

Sequential sampling was done. Sample collected through total coverage of the study population between 24th of Safar and 2nd of Rabea Alawal 1433 A.H. 100 patients attended the diabetic outpatient clinics and 96 patients were interviewed with a non-response rate of 4%.

Study variables:-

The study variables include:

1. Current patient diabetes situation.
2. Previous knowledge about diabetes mellitus.
3. Knowledge about Diabetic Septic Foot.
4. Source of previous knowledge.
5. Knowing the proper diabetic foot care.
6. Attitude towards performing the diabetic foot care.
7. Practice of the diabetic foot care.
8. Demographic variables: age, gender, educational level. and Occupation.

Methods of data collection:-

Data collected through personal structured interviews using questionnaires.

Data collection and processing:-

Four students interviewed the sampled patients after introducing themselves, describing the study and taking permission. Data collected on questionnaires.

Data analysis and interpretation of results:-

Data were analyzed by the computer using SPSS software.

Study period:-

Safar- Rabea Alawal 1433 A.H.

Ethical consideration:-

Verbal consent taken from all participants. confidential handling and management of the collected data. Names of the participants were not asked for.

Results:-

Table No 1:- The Socio-demographic Profile of the diabetic patients attending the diabetic outpatient clinics in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

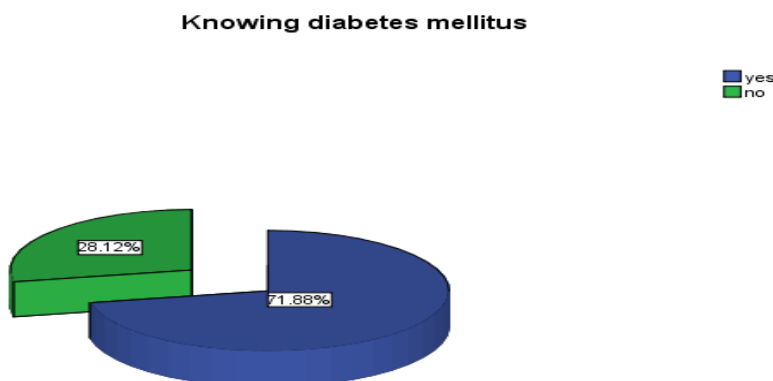
Age group	No. Pf Patients	%
<23	5	5.3

24-33	4	4.2
34-43	13	13.7
44-53	34	35.8
54-63	23	24.2
>64	16	16.8
Total	95	100.0
Educational level (edu)	No. of Patients	%
not educated	33	34.7
Primary or intermediate edu	38	40.0
Secondary education	12	12.6
college/postgraduate edu	12	12.6
Total	95	100.0

Occupation	No. Of Patients	%
not working	71	74.7
manual worker	1	1.1
employee	15	15.8
others	8	8.4
Total	95	100.0

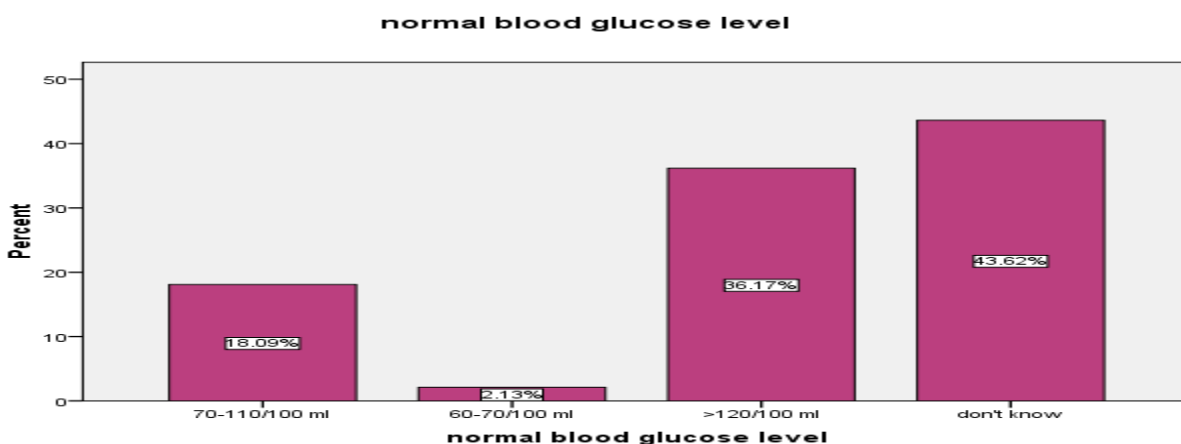
This table shows that, a large number of the studied group fall in the age groups (44-53) years (35.8 %) and (54-63) years (24,2%) respectively. Most of them are not working (74.7%). The majority lies in the low educational groups; primary or intermediate education (40%) and no education (34, 7%).

Figure No 1:- Individual perceived knowledge of diabetes mellitus among the diabetics attending the diabetic outpatient clinics in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.



This figure demonstrates perceived knowledge about diabetes mellitus among the studied group; about 72% thought they know diabetes while around 28% of them did not.

Figure No 2:- Knowledge about the normal fasting blood glucose level among the studied group in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.



This figure shows that only about 19% of studies group knew the correct range for the normal blood glucose. 43.6% thought they did not know it while about 38.4% reported knowledge based on a wrong figure

Table No 2:- Distribution of the studied group in King Khalid Hospital according to the duration of their diabetes mellitus (DM), Safar- Rabea Alawal 1433 A.H.

Average duration of DM	No.	%
5 years or less	29	30.5
6-10 years	24	25.3
11-15 years	18	18.9
more than 15 years	24	25.3
Total	95	100.0

The table shows that the majority of study subjects are known diabetics for more than 5 years (about 66,6%).

Table No 3:- Regular use of diabetic therapy by the studied group in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Regular use of therapy	No.	%
yes	86	90.5
no	9	9.5
Total	95	100.0

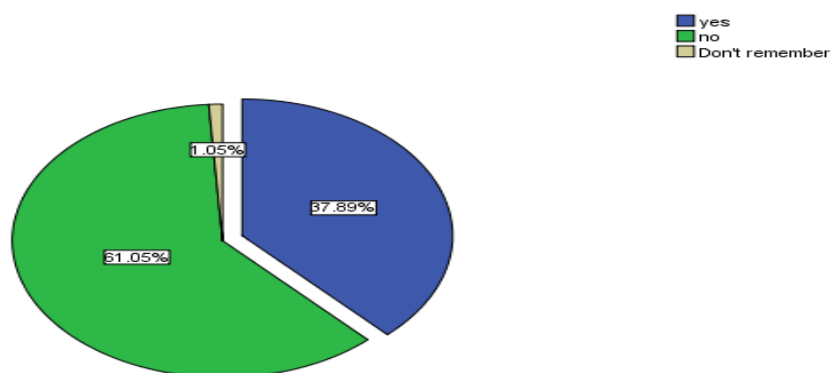
The table shows that the majority of study subjects use their diabetic treatment regularly (about 90.5%).

Table No 4:- Knowledge about the diabetic patients' increased risk of developing foot ulcers among the studied group in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Regular use of therapy	No.	%
yes	75	80.6
no	18	19.4
Total	93	100.0

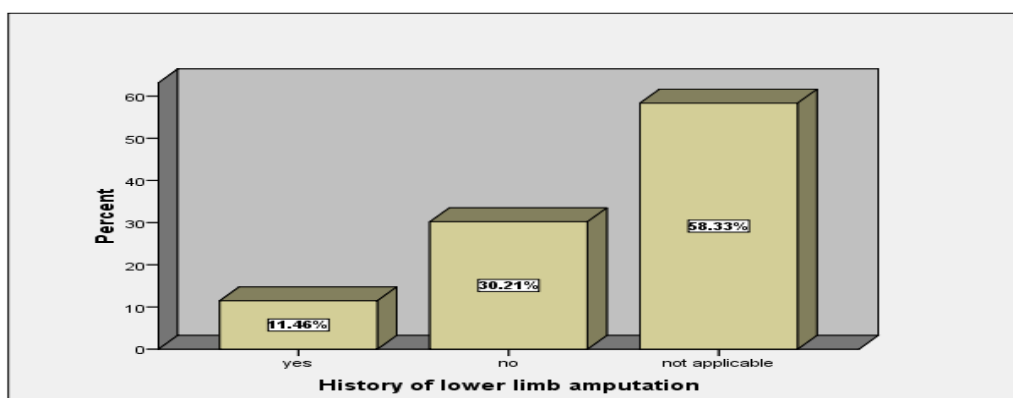
The table shows that most of the study subject knew about their increased risk of developing foot ulcers (80%).

Figure No 3:- Prevalence of diabetic foot ulcers among the interviewed diabetic patients in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Current or past history of prolonged foot ulcer

This figure shows that 37.9% of the studied diabetic patients currently have a history of diabetic foot ulcers.

Figure No 4:- Prevalence of lower limb amputation among the interviewed diabetic patients in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

History of lower limb amputation

This figure shows that 11,5% of the studied diabetic patients have undergone a lower limb amputation

Table 6:- The distribution of regular use of diabetic therapy by the presence of current or past history of foot ulcer among the studied patients in King Khalid Hospital in Safar- Rabea Alawal 1433 A.H.

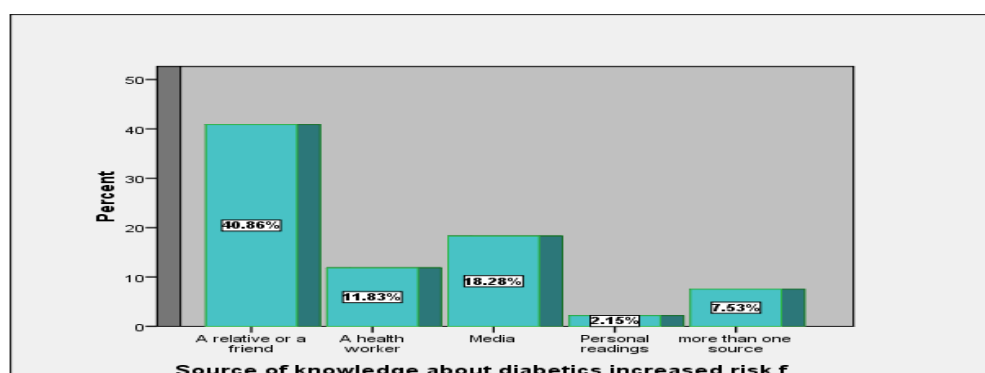
Current or past history of prolonged foot ulcer	regular use of the diabetes drugs		Total
	Yes	No	
yes	36	5	31
no	57	3	54
Don't remember	1	1	0
Total	94	9	85

Chi-Square= 11.442

P value= .003

This table shows that those having a current or past history of prolonged foot ulcer are using their diabetic drugs regularly. That association is statistically significant.

Figure No 5:- Sources of the interviewed diabetic patients' knowledge about their increased foot ulcer risk in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Source of knowledge about diabetics increased risk for foot ulcers

Relatives and friends were the most important source of information (40%) for the diabetic patients involved in this study.

Table No 7:- Knowledge of the study subjects about factors increasing their risk of developing foot ulcers in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Knowledge about risk factors	No.	%
Don't know	9	9.8
Know at least one risk factor	83	90.2
Total	92	100.0

Table shows about 90% of subject could at least list one factor increasing their foot ulcer risk .

Table No 8:- Knowledge of the study subjects about factors increasing their risk of developing foot ulcers in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Knowledge about foot care importance	No.	%
yes	83	89.2
no	10	10.8
Total	93	100.0

Table shows about 89% of the patients know the importance of taking care of their feet.

Table 9:- The relation between history of foot ulcer and the patient knowledge on importance of foot care in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Current or past history of prolonged foot ulcer	knowledge about importance of diabetics care for their feet		Total
	Yes	No	
Yes	34	0	34
No	58	10	48
Don't remember	1	0	1
Total	93	10	83

Chi-Square= 6.763

P value= .034

Table shows diabetics with history of prolonged foot ulcer are more likely to belief in the importance of practicing foot care. That association is statistically significant.

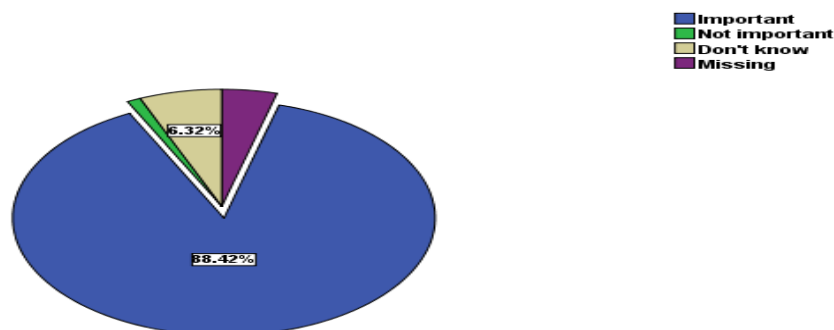
Table No 10:- Type of shoes used by the interviewed diabetic patients in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Type of shoes	No.	%
Ordinary shoes	63	68.5
Special prescription shoes	29	31.5
Total	92	100.0

Table shows that only 31.5% of the study subject are using special prescription shoes

Figure No 6:- Studied group believes about their importance of regular foot checks in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Belief about importance of regular foot check



This shows 87,5% of patients believed in the importance of regular foot checks

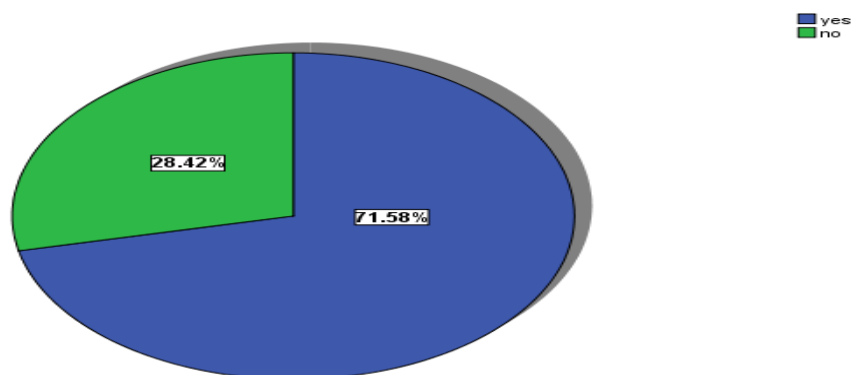
Table No 9:- Previous participation of the studied patients in health education activities among subjects interviewed in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Type of shoes	No.	%
Yes	18	19.1
No	76	80.9
Total	94	100.0

The table shows that only about 19% of the study subject have previously participated in health educational activities

Figure No 7:- Foot care practice rate by interviewed subjects in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

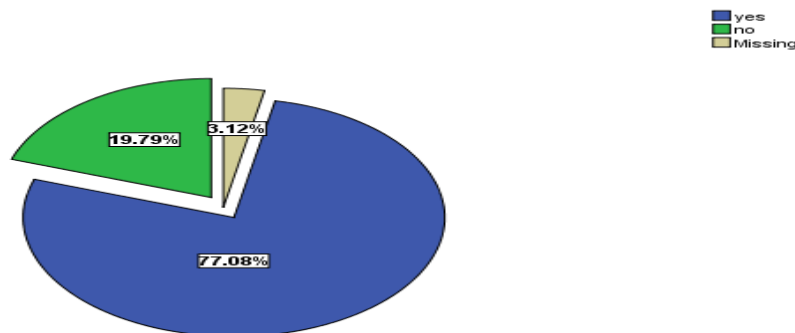
Practice of regular foot care and checking



This figure shows that about 71.5% of the sample studied are practicing foot care

Figure No 7:- Attitudes towards future participation in health education activities among subjects interviewed in King Khalid Hospital, Safar- Rabea Alawal 1433 A.H.

Opinion about participating in a foot care or diabetic special wear education session



This figure demonstrate that about 77% of the participants are willing to participate in future health education opportunities

Discussion:-

In this study, the mean age of the participants was 51 years, thus 95% of the participants lie between (35 - 66) years. Most of them were poorly educated (table 1). The results showed that among the 96 diabetic patients interviewed, 72% thought they know diabetes mellitus. This is a relatively high percentage as a more detailed study on a larger population group in Al Qasim, Saudi Arabia, revealed an awareness rate of about 31.3. Moreover only about 19% of studies group knew the correct range for the normal blood glucose (figure 2).

The data showed that 37.9% of the studied diabetic patients have a current or past history of diabetic foot ulcers (figure 3) and 11.5 % lower limb amputation rate (figure 4). No other related complications were reported by the interviewed subjects.

Majority of study subjects (about 90.5%) use their diabetic treatment regularly (table 4). A statistically significant association was reported between regular therapy use and a positive history of prolonged foot ulcer ($p=0.003$), (table 6).

80% of the patients declared knowledge of their increased risk of foot ulcers with relatives and friends being their primary source of information (figure 5). 90% of the subject could list at least one risk factor increasing their likelihood of developing foot ulcers (table 7). The study in Al Qasim reported similar figure though the risk factors were more extensively analyzed there.

About 89% of patients (table 8) knew the importance of foot care for diabetic patients. There was a significant relation between the rate of their knowledge and their history of foot ulcers ($p=0.034$) (table 9). This information raises the possibility that some of the aware subjects might have acquired their knowledge following the incident. Although the main source of patients' knowledge about the various factors was their relatives and their friends (example figure 5). Same source was also revealed in Al Qasim study in addition to the media. Other associations with foot care practice ($p=0.162$) and with use of special prescription shoes ($p=0.07$) were not significant. The relation between use of special shoes and history of foot ulcer were also not significant ($p=0.211$). Relation between knowledge of importance of foot care and educational level ($p=0.439$), age distribution ($p=0.879$), and gender ($p=0.721$) were all not significant unlike the suggestions revealed by some of the relatively few literature available in the country and Arab region. No significant associations could be traced between the knowledge about importance of foot care and participants' attitude towards participating in future health education activities.

No significant relations could be demonstrated as well between the rate of lower limb amputation and any of the studied factors.

The majority of the patients (71%) did practice some sort of foot care (figure 7). About 77% of the participants showed a positive attitude towards future participation in educational activities about diabetic foot care and diabetics foot wear.

Conclusion:-

This study done in King Khalid Hospital in Hail during Safar- Rabea alawal 1433. It showed the following results about the interviewed diabetic patients:

1. 37.9% of them have a current or past history of diabetic foot ulcers.
2. 11.5 % of them have undergone a lower limb amputation.
3. About 90.5% used their diabetic treatment regularly with a statistically significance with history of prolonged foot ulcer ($p=0.003$).
4. The reported levels of awareness were generally acceptable and most of them showed a statistically significant relation with a positive of foot ulcers.

Recommendations:-

1. There is a need to extensively investigated the causes of the high reported foot ulcer rate and amputation rates..
2. Population based health education and training activities on diabetic septic foot problems and risk factors should be implemented.
3. There should be more focus on promotion of proper foot care practices; health promotion campaigns should be designed and implemented.
4. Further studies are needed to deeply investigate the issues.

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