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RESEARCH ARTICLE

LEVEL OF EDUCATION AMONG DIABETIC PATIENT REGARDING DIABETIC FOOT IN MAKKAHPOPULATION

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Abstract

Background: As many of diabetic complications, diabetic foot are avoidable however proper education is essential as it leads the patient to be aware of the problem and its prevention which can save the patient's feet from amputations.

Objectives: To assess knowledge of diabetic patients regarding foot care and its determinants.

Subjects and methods: A retrospective study has been carried out to compare diabetic patients without foot problems to those who had them. It included all diabetic patients from four major hospitals in Makkahwith and without Diabetic foot from Makkah city. A study-specific questionnaire was designed included general information, level of education, and added questions at the end to measure the knowledge.

Results: The study included 392 patients. Their age ranged between 13 and 90 years (53.6±13.3 years). Almost two-thirds of the patients were males (62%). Majority were Saudis (86.1%). Type II diabetes was reported by 52.1% of the patients. Regular compliance with diabetic clinic/center was mentioned by 65% of them. Adherence to anti-diabetics was reported by majorities (87%). History of feet wound lasted 3-4 weeks was reported among 42.9% of diabetic patients. Where is a history of amputation was reported among 20.9% of them. The mean knowledge score was 5.6 out of 10 (56%). Good knowledge regarding foot care was higher among younger patients (≤30 years) compared to older patients (>50 years (68% versus 41.4%, p<0.001). Majority of postgraduate patients (87%) compared to 34.7% of illiterate patients had good knowledge regarding foot care knowledge, p<0.001. The highest level of good knowledge regarding foot care was reported among patients with onset of diabetes between 11 and 20 years (70%) whereas the lowest level was reported among those with onset after 20 years (46.2%), p=0.011. Good foot care knowledge was more reported among type 1 than type 2 patients (73.3% versus 51.7%, p<0.001). Regular compliance with diabetic

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Clinic/center was accompanied with higher knowledge level, p<0.001. Also, adherence to anti-diabetics was accompanied with higher knowledge level, p=0.011.

Conclusion: Knowledge of diabetic foot care in Makkah is moderate (56%), younger, more educated, type 1 diabetic patients and those who attended diabetic clinics regularly and being more compliant with anti-diabetics were more knowledgeable. Heath education programs are recommended particularly to older and less educated patients. In addition, patients should be encouraged to attend diabetic clinics regularly.

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Introduction:-

Diabetes mellitus is one of the most common health problems affecting all age groups worldwide and was estimated to be2.8% in 2000 and 4.4% in 2030.[1]The prevalence of diabetes in the Medicare population may be one-third higher than previously estimated.[2]Overall, approximately 8% of diabetic Medicare beneficiaries have a foot ulcer and 1.8% has an amputation. These prevalence rates are further elevated for the subset of beneficiaries with lower extremity peripheral artery disease.[2]

The prevalence rates for foot ulcer and lower extremity amputation among diabetic Medicare beneficiaries vary dramatically by geographic region. More than 16 million people in the United States (U.S.) have diabetes mellitus. The prevalence of diabetes among those over 65 years of age was last estimated by the Centers for Disease Control and Prevention (CDC) using 2008 data from the National Health Interview Survey. It is about 19.9 percent among those ages 65 to 74 and 17.1 percent among those more than 75 years of age. These estimates are based on self-reports and are thought to underestimate the true prevalence by one-third.[2]

The prevalence of diabetes in Saudi Arabia was 34.1% in males and 27.6% in females (mean age is 55 years),such high prevalence make diabetes an endemic and stands as a major health issue in our healthcare systems and society. [3]

One of diabetes common and serious complications is diabetic foot problem, which is a major cause of morbidity and mortality in patients with diabetes. Infection, ischemia and neuropathy are all contributing to produce tissue necrosis[3].

Studies showed that up to 10% of patients with diabetes would develop a foot ulcer sometime during their lives [4] and it is the most common cause of non-traumatic lower limb amputation and precedes 85% of the cases[5].

The prevalence of diabetic foot problems differs between countries in the world[5]. In Saudi Arabia, DF wasprevalent in 13.5% of the diabetic patients referred to the nephrology clinic[6]; several factors make this prevalence higher as compared to the West including patient education.

As many of diabetic complications, diabetic foot are avoidable however proper education is essential as it leads the patient to be aware of the problem and its prevention which can save the patient's feet from amputations. Educators including physicians usually educate their patients on controlling their blood sugar either with insulin or diet mainly and rarely about the feet care.

As prevention requires knowledge it also needs change in behavior. To assess our ability to effect change in behavior we need to measure not only knowledge but also understanding the change of behaviors. This study was carried out using a structured questionnaire to assess the knowledge among diabetic patients regarding feet care.

Subjects and Methods: -

A retrospective study has been carried out to compare diabetic patients without foot problems to those who had them. It included all diabetic patients with and without Diabetic foot from Makkah city, there was no age limit, the study excluded non-Makkah residents (pilgrims), non-diabetic.

A study-specific questionnaire was designed included general information, level of education, and added questions at the end to measure the knowledge.

Ethical approvals from Um AlQura University and the ministry of health in Makkahwere taken to collect the data from four major hospitals in Makkah (AL Noor specialist hospital, King Faisal specialist hospital, Hera general hospital, king Abdulaziz hospital). Then, the questionnaires were distributed to patients from the general population with diabetes and from those attending and following in a diabetic center in Makkah. Patients were grouped into two categories; 1) diabetics without foot problems, and 2) and those with foot complications. Then data was collected and analyzed using (SPSS, version 22).

Results: -

The study included 392 patients. Their age ranged between 13 and 90 years (53.6±13.3 years). Almost two-thirds of the patients were males (62%). Majority were Saudis (86.1%). More than one-quarter of them were professionals (26.4%), retired (29.4%) or not working (26.1%). Almost one third of them (33.5%) were at least university graduated whereas 18.4% of them were illiterates.

Table 2 summarizes the diabetes-related characteristics of the participants. Among majority of the participants (84.9%), diabetes was diagnosed after age of 20 years. Type II diabetes was reported by 52.1% of the patients. Regular compliance with diabetic clinic/center was mentioned by 65% of them. Adherence to anti-diabetics was reported by majorities (87%).

History of feet wound lasted 3-4 weeks was reported among 42.9% of diabetic patients as shown in figure 1 whereas history of amputation was reported among 20.9% of them. Figure 2

Figure 3 showed that 78.3%of the patients knew that they should reach their sole of the foot and see if there is any problem,42.9% knew that theyshould daily examine their feet. It was found that 90.3% of them recognized that washing feet should be daily, 54.8% of them recognized using warm water for that. Almost half of patients (46.9%)know that a clean towel should be used to dry their feet after washing it. Less than half of them (48.7%) know that they should cossed their legs on sitting. Around 54.6% of the paticipantsknew thatthey should usea cream to moisturize their feet, 35.5% of them know that it should be used between their toes. We found also that 74.0% knew that they should cut nails by themselves,35.2% knew the proper way of cutting nails.

The mean knowledge score was 5.6 out of 10 (56%). From table 3, it has been shown that good knowledge regarding foot care was higher among younger patients (≤30 years) compared to older patients (>50 years (68% versus 41.4%, $p<0.001$). Majority of postgraduate patients (87%) compared to 34.7% of illiterate patients had good knowledge regarding foot care knowledge, $p<0.001$. Other demographic factors (gender, nationality, and occupation) were not significantly associated with foot care knowledge.

The highest level of good knowledge regarding foot care was reported among patients with onset of diabetes between 11 and 20 years (70%) whereas the lowest level was reported among those with onset after 20 years (46.2%), $p=0.011$. Good foot care knowledge was more reported among type 1 than type 2 patients (73.3% versus 51.7%, $p<0.001$). Regular compliance with diabetic clinic/center was accompanied with higher knowledge level, $p<0.001$. Also, adherence to anti-diabetics was accompanied with higher knowledge level, $p=0.011$. There was no significant difference between patients with history of foot wound lasts 3-4 weeks/amputation and knowledge of diabetic foot care. Table 4

Table 1:-Demographic characteristics of the participants

	Frequency	**Percentage**
Age (years) (n=389)		
≤30	25	6.4
31-50	120	30.8
>50	244	62.8
Range	13-90	
mean±SD	53.6±13.3	
Gender		
Male	243	62.0
Female	149	38.0
Nationality (n=381)		
Saudi	328	86.1
Non-Saudi	53	13.9
Occupation (n=360)		
Professionals	95	26.4
Students	15	4.2
Military	15	4.2
Retired	106	29.4
Manual	35	9.7
Not working	94	26.1
Education		
Illiterate	72	18.4
Primary	74	19.0
Intermediate	47	12.0
Secondary	67	17.1
University	108	27.6
Postgraduate	23	5.9

Table 2:- Diabetes-related characteristics of the participants

	Frequency	**Percentage**
Age of diabetes onset in years (n=385)		
≤10	28	7.3
11-20	30	7.8
>20	327	84.9
Type of diabetes (n=386)		
Type I (n=	45	11.7
Type II	201	52.1
Unknown	140	36.2
Regular compliance with diabetic clinic/center (n=389)		
Yes	253	65.0
No	136	35.0
Adherence to anti-diabetics		
Yes	341	87.0
No	51	13.0

Table 3:-Association between knowledge of foot care and demographic characteristics of patients

	Diabetic care knowledge		**p-value***
	Poor N=196	**Good N=196**	
Age (years) (n=389)			
≤30 (n=25)	**8 (32.0)**	**17 (68.0)**	
31-50 (n=120)	**44 (36.7)**	**76 (63.3)**	
>50 (n=244)	**143 (58.6)**	**101 (41.4)**	**<0.001**
Gender			

Male (n=243)	**127 (52.3)**	**116 (47.7)**	
Female (n=149)	**69 (46.3)**	**80 (53.7)**	**0.252**
Nationality (n=381)			
Saudi (n=328)	**162 (49.4)**	**166 (50.6)**	
Non-Saudi (n=53)	**28 (52.8)**	**25 (47.2)**	**0.642**
Occupation			
Professionals (n=95)	**44 (46.3)**	**51 (53.7)**	
Students (n=15)	**5 (33.3)**	**10 (66.7)**	
Military (n=15)	**9 (60.0)**	**6 (40.0)**	
Retired (n=106)	**59 (55.7)**	**47 (44.3)**	
Manual (n=35)	**13 (37.1)**	**22 (62.9)**	
Not working (n=94)	**49 (52.1)**	**45 (47.9)**	**0.251**
Education			
Illiterate (n=72)	**47 (65.3)**	**25 (34.7)**	
Primary (n=74)	**40 (54.1)**	**34 (45.9)**	
Intermediate (n=47)	**22 (46.8)**	**25 (53.2)**	
Secondary (n=67)	**38 (56.7)**	**29 (43.3)**	
University (n=108)	**45 (41.7)**	**63 (58.3)**	
Postgraduate (n=23)	**3 (13.0)**	**20 (87.0)**	**<0.001**

*** Chi-square test**

Table 4:-Association between knowledge of foot care and diabetes-related characteristics of patients

	Diabetic care knowledge		**p-value**
	Poor N=196	**Good N=196**	
Age of diabetes onset in years (n=385)			
≤10 (n=28)	**10 (35.7)**	**18 (64.2)**	
11-20 (n=30)	**9 (30.0)**	**21 (70.0)**	
>20 (n=327)	**176 (53.8)**	**151 (46.2)**	**0.011**
Type of diabetes (n=386)			
Type I (n=45)	**12 (26.7)**	**33 (73.3)**	
Type II (n=201)	**97 (48.3)**	**104 (51.7)**	
Unknown (n=140	**83 (60.0)**	**56 (40.0)**	**<0.001**
Regular compliance with diabetic clinic/center (n=389)			
Yes (n=253)			
No (n=136)	**111 (43.9)**	**142 (56.1)**	
	84 (61.8)	**52 (38.2)**	**<0.001**
Adherence to anti-diabetics			
Yes (n=341	**162 (47.5)**	**179 (52.5)**	
No (n=51)	**34 (33.3)**	**17 (33.3)**	**0.011**
History of foot injury lasts for 3-4 weeks			
Yes (n=168)	**82 (48.8)**	**86 (51.2)**	
No (n=224)	**114 (50.9)**	**110 (49.1)**	**0.683**
History of toe/foot/lower limb amputation			
Yes (n=82)			
No (n=310)	**44 (53.7)**	**38 (46.3)**	
	152 (49.0)	**158 (51.0)**	**0.456**

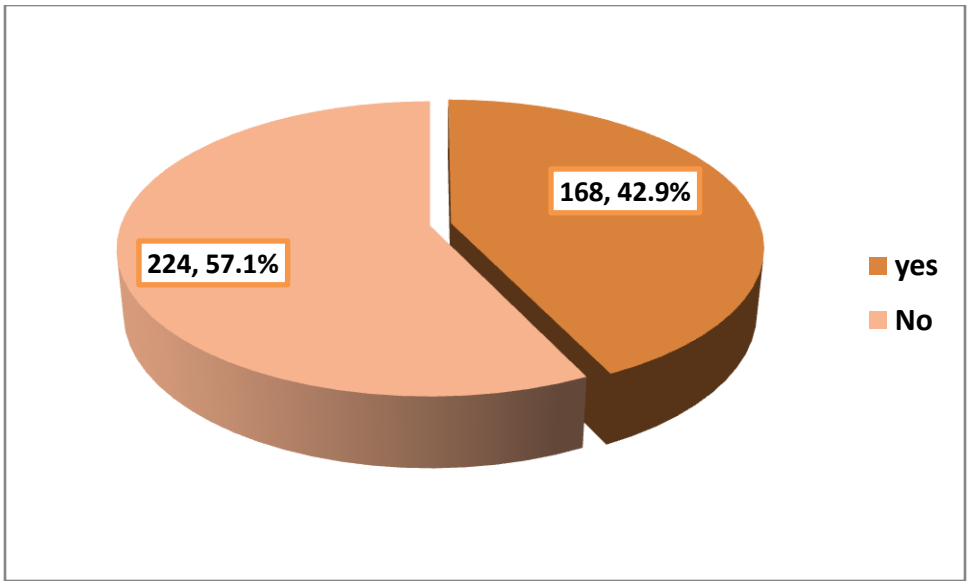


Figure 1:- History of feet wound lasted 3-4 weeks among diabetic patients

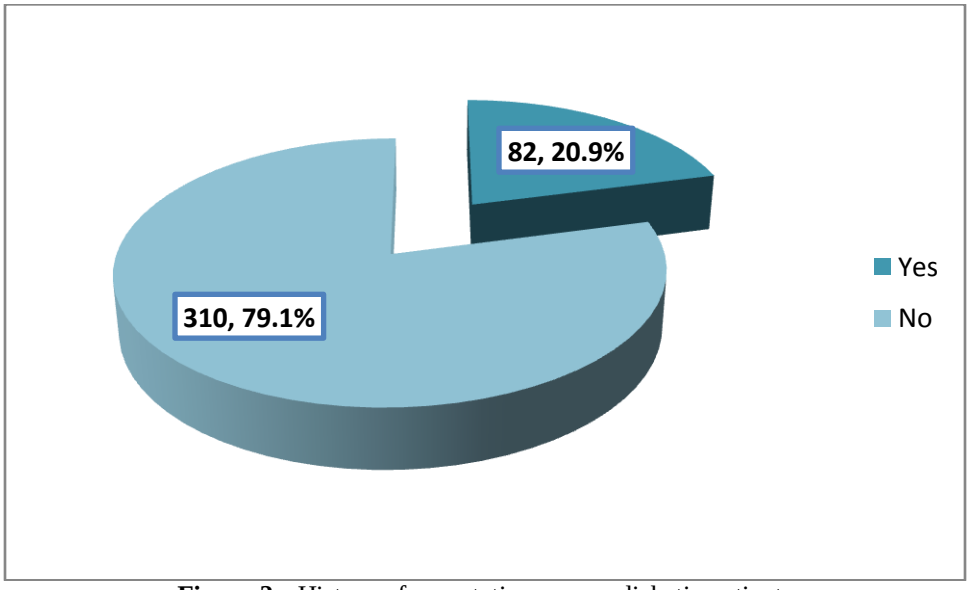
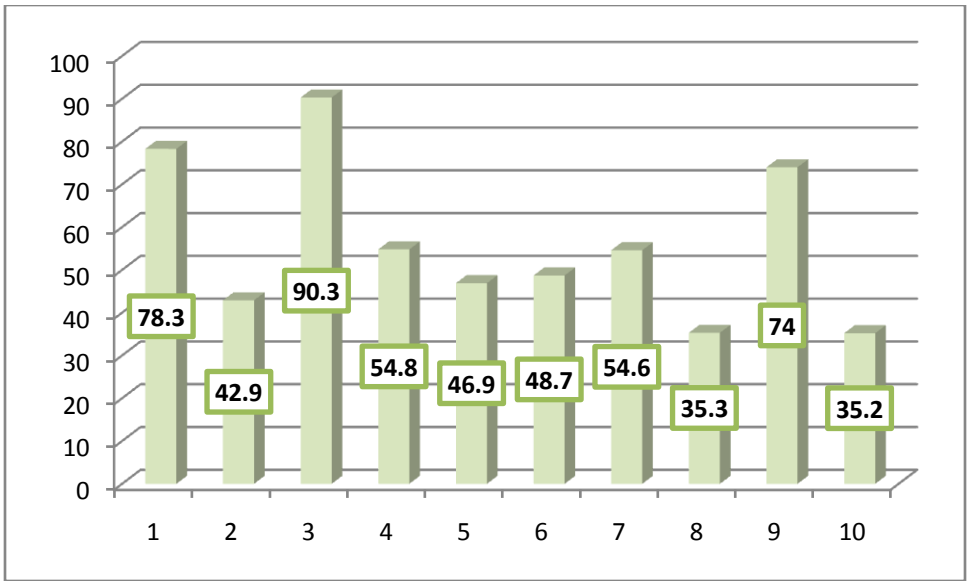


Figure 2:- History of amputation among diabetic patients



1: Ability to reach the sole of the foot
2: Daily foot examination
3: Washing foot daily
4: Using warm water to wash feet
5: Drying the feet after washing with clean towel
6: Sitting with the feet crossed
7: Using the cream to moisturize the feet
8: Using the cream to moisturize between toes
9: Self cutting of the toe nails
10: Way of cutting the nails

Figure 3:- Diabetic foot care knowledge of 431 diabetic patients

Discussion:-

In the current study, the mean score of knowledge was 5.6 out of 10 (56%). In a study conducted by Al-Juaid in Taif, Saudi Arabia (2005), [7] a main knowledge score of 66% has been reported. In Najran, Saudi Arabia the main knowledge score was 6.5 out of 11 (60%). [8] In USA, Southeastern State, the main score of knowledge of a group of diabetic patients without foot ulcer was 13.75 out of 20 (68%) whereas it was 13.88 out of 20 among those with foot ulcer (69.4%). [9]

In the current study, younger patients were more knowledgeable than older patients. The same has been reported by Al-Juaid in another previous Saudi study.7This could be attributed to the fact that, younger patients were healthier and they can take care of themselves.

In accordance with other syudies,[7, 10, 11] higher educated patients were more knowledgeable than others. The knowledge of appropriate foot care has been suggested to be positively influenced by patient education which in turn reduces the risk of foot ulceration and amputation in high-risk diabetics.[12] The association between education and knowledge may be due to the fact that, educated patient were able to read and understand some of educational supportive materials and also use information technology to obtain more information about the disease. In addition, in a study conducted in India, it was concluded that low knowledge scores were common with poor formal education, thus confirming relationship between education and knowledge.[13] Role of formal/school education is further confirmed by a study from Italy where the presence of foot complications was correlated with cigarette smoking, insulin treatment, and low levels of school education.[14]

Patients who regularly compliant with diabetic clinics visits and anti-diabetics were more knowledgeable regarding diabetic foot. This could be attributed to the fact that patients usually got their information from primary care centers sources which help them to be more compliant with anti-diabetics and also more knowledgeable of foot care.

Therefore, health education is an essential task in primary health care centers as well it is one of the important task and responsibility of primary health care physicians.

Type 1 diabetic patients in the present survey reported better foot careknowledge than those of type 2. This could be attributed to the fact that type 1 diabetes is more associated with complications including diabetic foot.[15] Therefore, they had to be more knowledgeable about it.

Patient`s gender has shown no relationship regarding knowledge and practices of foot care whereas in another study conducted in India, low scores for foot care knowledge were more common in women (78.5%) than in men (62.5%). However this can be explained on the basis that in that particular study, there were more women with low educational status.[16]

In conclusion, Knowledge of diabetic foot care in Makkah is moderate (56%), younger, more educated, type 1 diabetic patients and those who attended diabetic clinics regularly and being more compliant with anti-diabetics were more knowledgeable. Heath education programs are recommended particularly to older and less educated patients. In addition, patients should be encouraged to attend diabetic clinics regularly.

The present research has some important limitations. First, our sample was recruited from attendees of major hospitals in Makkah ignoring those attending primary health care centers, which limits the representative of the sample. The used tool was not subjected to tests of validity and reliability. Despite of that, our study has been able to determine the knowledge of foot care among diabetic patients in Makkah, Saudi Arabia and identifying factors associated with that knowledge.

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