An Experimental Study to Assess the Knowledge about Foot Care before and after Education among Type 2 Diabetic Adult in the Eastern Province Region of Kingdom of Saudi Arabia

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ABSTRACT

Diabetes mellitus (DM) is regarded as one of the most difficult public health issues, with 422 million adult population worldwide living with diabetes in 2014, up from 108 million in 1980. Diabetic foot (DF) disease is one of the most serious complications of diabetes. This complication affects nearly half of all patients and accounts for nearly 80% of all nontraumatic lower limb amputations. Proper patient awareness about foot care is an important defence line in preventing DF problems and amputation. The primary goal of this study was to assess diabetic patients' knowledge of DF, as well as their adherence to foot care, and to make recommendations for additional steps to be taken to avoid the complications of foot damage. The significant difference between pre and post knowledge score in this study demonstrates that education and regular attention on diabetic patients may prevent disability and reduce medical care expenditure in the future. Furthermore, a special training programme may pave the way for diabetic patients to have a bright future by reducing foot complications. Providing resources and special training for health providers will ensure regular foot care and education, which should be a priority of any diabetes prevention strategy. Because the study shows significant results on education to improve foot care knowledge, it is also recommended that both theory and practical based training programmes be conducted to improve patient knowledge and avoid foot complications. Finally, nurses should be encouraged to use the knowledge they have gained to educate diabetic patients.

Keywords
Diabetes, Foot ulcer, Foot care, Complications

Introduction

Diabetes mellitus (DM) is considered as one of the most challenging public health concerns, as globally 422 million adults were living with diabetes in 2014, compared to 108 million in 1980[1]. The global prevalence of diabetes has increased nearly four times since 1980, rising from 4.7% to 8.5% in the adult population. One of the major complications associated with DM is the diabetic foot (DF) disease. This complication almost affects 50% of patients and accounts for nearly 80% of all nontraumatic amputations of the lower limb[2,3]. The disease represents nearly 35% of all hospital admissions in diabetic specialized clinics[2]. DF complication is the major cause of a significant loss of quality and years of life of diabetic patients[3,4]. In terms of cost, it represents 12-15% of the overall cost associated with diabetes and up to 40% in developing countries[4,5]. Proper patient's awareness about foot care is important defense line in preventing DF problems and amputation[6]. Correct practices of foot health care are essential for reducing the incidence of foot ulcers and complications[7]. Gulf Arabian countries are characterized by high and increasing diabetes prevalence. In Saudi Arabia, the prevalence of DM in adults was 25%[8]. Recent research in Saudi Arabia suggested that more than 44% of individuals aged 55 or older had severe to uncontrolled diabetes with long-term complications[9]. Although there are significant studies in Saudi Arabia about DF and its complications[10], studies in Jazan region are scanty. The main objective of this study was to measure the knowledge level among diabetic patients about DF and to assess the adherence level among diabetic patients to foot care and also recommend for further steps to be taken to avoid the complications of foot damages.

Literature review

A cross-sectional study was conducted at Al-Manhal Family Medicine Training Center in Abha city, capital of Aseer region, southwestern Saudi Arabia during the first quarter of the year 2004. The total number of diabetic patients registered at Al-Manhal Family practice was 470 patients. Two hundred and sixty seven of them were males. Male diabetic patients who attended during the first three months of 2004 were 107 patients, which represented 40% of male diabetic patients in their practice. Mean age was 58 years, mean duration of DM was 10 years, 70% were educated and 6% were smokers. Good DM control was found among 24%, while 26% were obese. About 37% lacked adequate knowledge about the negative effect of DM on the feet, between 9-22% suffered from different symptoms of diabetic neuropathy. More than half of the diabetics checked their feet regularly, while 47% did not. Dry feet and foot fissures were found in 32% and 17% of diabetics respectively. Fungal infections were detected in 31% of diabetics and weak or absence of dorsalispedis pulse was found in 6% of patients. Fungal infection was more common in diabetics with long duration of DM (p=0.02)[11].

Many of the patients attending the diabetic clinic are older and some cannot see feel or reach their feet, which means that they are often unaware of any injuries. Diabetic foot ulcers should be treated to maintain health status, improve quality of life and reduce the number of amputations[12]. However, because many of the patients do not complain about any symptoms related to foot problems, they might not be properly assessed for diabetic foot care knowledge and actual foot care behaviors. Consequently, nurses do not include these problems in the nursing care plan and finally these needs are inadequately treated[13]. HIV treatment and even HIV itself can lead to the metabolic syndrome, which leads to the development of diabetes or can worsen the glycemic control of patients with existing diabetes[14].

Methods

This research is exploratory in nature as it attempts to explore the knowledge of foot care among diabetic cases. This research is an experimental design to test the effectiveness of education between pre knowledge score and post knowledge score. It is also believed that the qualitative data gives large volumes of quality data from a limited number of diabetic cases. Total score has been calculated for pre and post score assessment to determine the effectiveness of foot care education.

This experimental design has been conducted in the Eastern Province of Dhahran, Rastanura, Abqaiq, and Al Hassa, Johns Hopkins Aramco Healthcare (JHAH). Johns Hopkins Aramco Healthcare is a first-of-its-kind health care joint venture between Saudi Aramco, a world leader in energy, and Johns Hopkins Medicine. John's Hopkins Aramco Healthcare is one of the first hospitals of John's Hopkins chain in Saudi Arabia, located at the following address: 8131 Medical Access Rd No. 1, Dhahran 34465, Saudi Arabia. It is one of the best hospitals in the Kingdom, which was built by one of the most powerful Arabic-American companies, Aramco. The hospital is provided with all health care services, starting from the highest class Emergency Services and ending up with a few specific medical department provided with the latest and the most sophisticated medical technologies and equipment. John's Hopkins Aramco Healthcare (JHAH) has established an enviable reputation as a world class healthcare provider, with leading technologies and treatments that enhance the lives of families across the Kingdom of Saudi Arabia. John's Hopkins Aramco Healthcare (JHAH) chooses to share our accreditation status to help patients identify Healthcare as a provider that has met rigorous standards for delivering quality.

Methodology

A purposive sampling has been used for selecting the participants. The outpatients who could participate in the study who are the ones that would meet the inclusion criteria at the diabetic outpatient clinic during the data collection period.

$$N = \frac{Z^2pq}{d^2}$$

Where
q = 1 – p; p = assumed proportion for the study;
d = 95% confidence interval is desired with d = 0.05
If P= 0.45 so q = 0.55; z = 1.96
Sample size for this research has been calculated by using appropriate sample size determination formula. Total of 94.12 samples has been arrived by using the above formula. Therefore, researcher decided to select 100 samples for this research which will be approximately 20 to 25 patients in each hospital.

Inclusion criteria
1. Patients with type 2 diabetes, both male and female, with an age over 18 years

2. Patients who are able to write and read or can be helped to fill in the Questionnaire

3. Patients who are living under the eastern province of Saudi Arabia

4. Patient should not have any mental disease or dementia

5. Patient should be willing to participate in this research

The questionnaire will also be pilot tested by experts in Saudi Arabia before data collection. The questionnaire will be classified under two categories. The first category is about the demographic questions. The second category is about the knowledge on foot care.

The participants consisted of sixty nine (69) from the eastern Province of Saudi Arabia were included considered with inclusion criteria used for participating in the study. Method for data collection and instrument A pre-tested structured questionnaire was used as study tool. This tool was developed after consulting relevant studies conducted in Saudi Arabia.

In this research, variables had been measured by a valid measurement by using a standardized questionnaire to obtain the reliable data from the respondents. The questionnaire used in this research has been obtained from the previous research and researcher's interest. The form of knowledge given to respondents includes the knowledge based education was playing a key role in diabetic foot care development to improve respondent's knowledge. The survey was done through telephonic interview since current pandemic situation. Since it was a telephonic interview the researcher was not able to achieve the estimated sample size. The knowledge scores of respondents of diabetic foot care management and influencing factors were examined in this research.

Data Analysis

After collecting the questionnaires from the participants, the researcher has conducted the analysis and processing stage, where the collected data would be transformed into meaningful information in the Microsoft Excel. According to Collis et al (2003), 'statistics is a body of methods and theory that is applied to quantitative data when making decisions in the face of uncertainty'. Due to the adoption of a positivistic paradigm, quantitative data was collected on which statistical analysis was conducted by using SPSS (Statistical Package for Social Sciences).

After collecting the information through questionnaire for both pre and post education, the data gathered has been entered into Excel software as useful information through interpreting the information obtained from the statistical software after input the data to obtain the information in the desired format. These results would have been analyzed to transform the data to inform reliable information that could be used to draw up reliable recommendations that can be used by further researches. Due to COVID -19, the researcher was not able to achieve the determined sample size. So the researcher collected 69 samples and was recruited with inclusion and exclusion criteria.

Results

This section presents the analysis of the main results that were obtained from the data collected from the survey that was filled and returned by the participants. The questionnaire has been divided into two main categories. The first category is mainly descriptive and presents the main demographic information and background about the participants as well as the subject-specific elements that are included in the questionnaire. The second category is related to knowledge based questions to find the participant's knowledge on foot care among Diabetic patients. These fifteen (15) questions were graded one mark for correct answers and zero mark for wrong answers. The pre and post score total grade has calculated by the researcher as said above. Paired Sample T test has been used to compare between pre and post knowledge scores to find the significant level.

Variable Distribution

In this section, the respondent's distribution of the demographic variables is presented as follows:

Gender: The first variable that was initiated in the first question is the respondent's gender to identify if this variable would affect the respondent's opinion and choice of answers. The distribution of the respondents showed that there are 40% Females and 60% Males. These results have been shown in Figure 1.

Table 1: Gender Classification

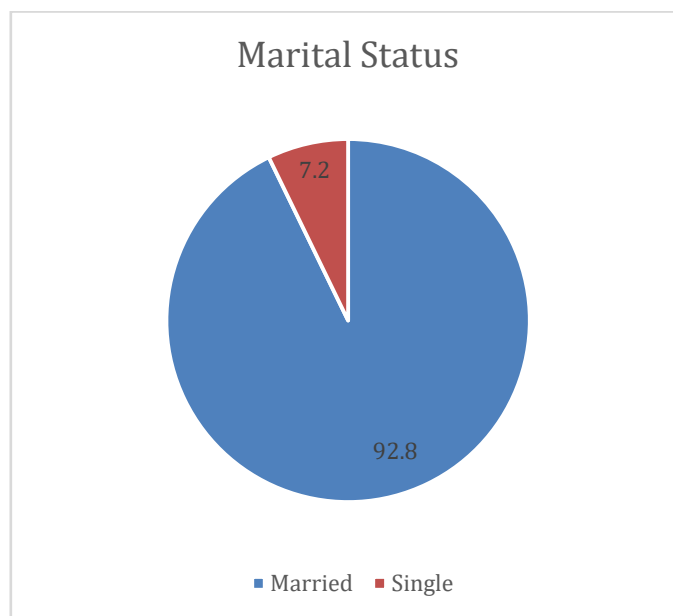| Gender	Frequency	Percentage
Male	42	60.9
Female	27	39.1
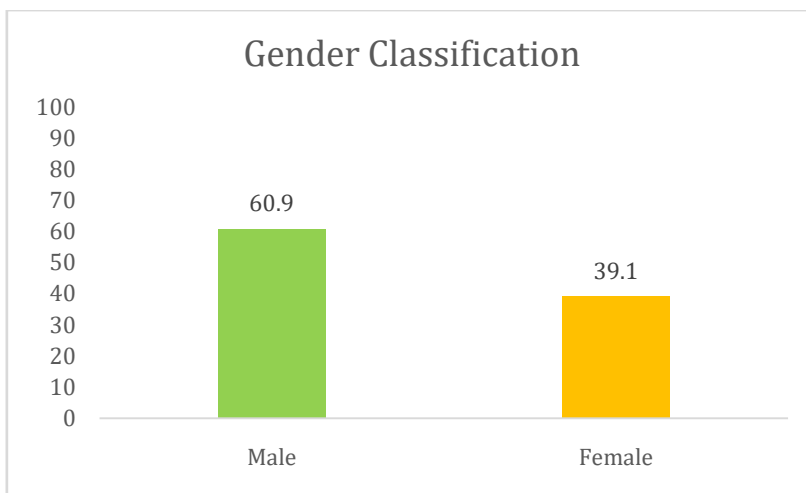
Figure 1: Gender Classification

The **Marital Status** of the participants has been given below:

Table 2: Marital Status

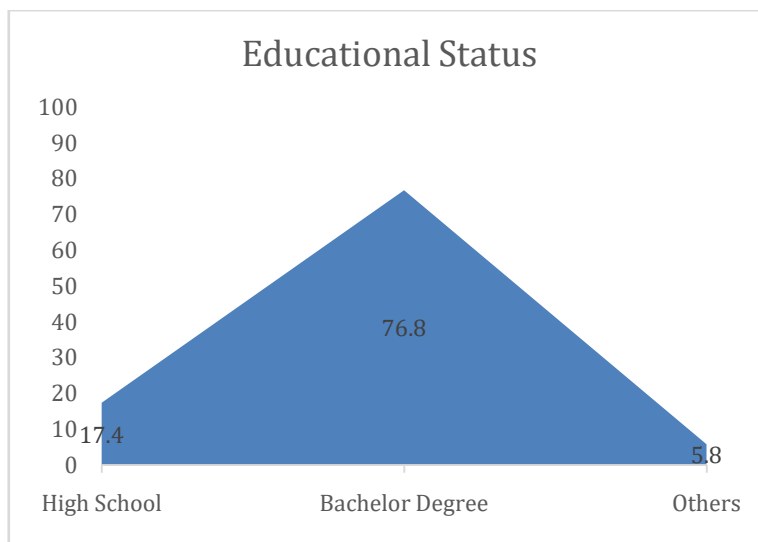| Marital Status	Frequency	Percentage
Married	64	92.8
Single	5	7.2

Figure 2: Marital Status

The current **Educational status** of the participants has been distributed as follows:

Table 3: Educational Status Classification

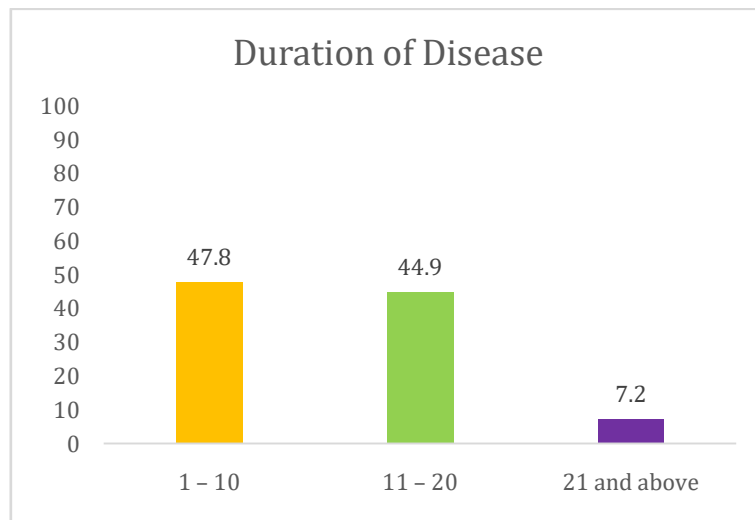| Educational Status	Frequency	Percentage
High School	12	17.4
Bachelor Degree	53	76.8
Others	4	5.8

Figure 3: Educational Status Classification

The patient's **Diabetic duration status in years** as also collected and grouped under following categories. The highest category above 21 years is lower than other two categories.

Table 4: Duration of Disease

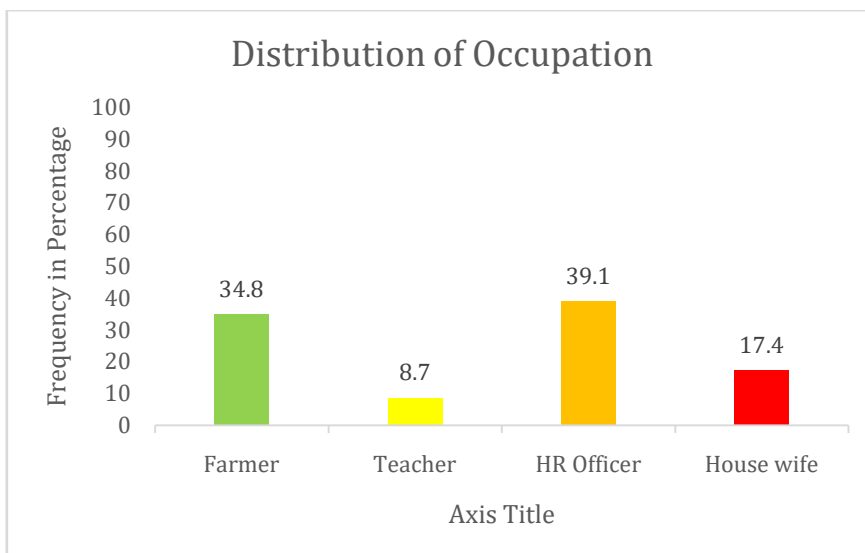| Duration of Disease in Years	Frequency	Percentage
1 – 10	33	47.8
11 – 20	31	44.9
21 and above	5	7.2

Figure 4: Duration of Disease

The current **Occupation status** of the participants are distributed as follows:

Table 5: Occupation Status

| Occupation	Frequency	Percentage
Farmer	24	34.8
Teacher	6	8.7
HR Officer	21	39.1
House wife	12	17.4

Figure 5: Occupation Status

The participant's **Current location** has also recorded and the location distribution as follows:

Table 6: Classification of Region

Region	Frequency	Percentage
Eastern Province	3	4.3
Al Hassa	18	26.1
Bahrain	3	4.3
RasTanura	3	4.3
Safwa	2	2.9
Abqaiq	40	58.0
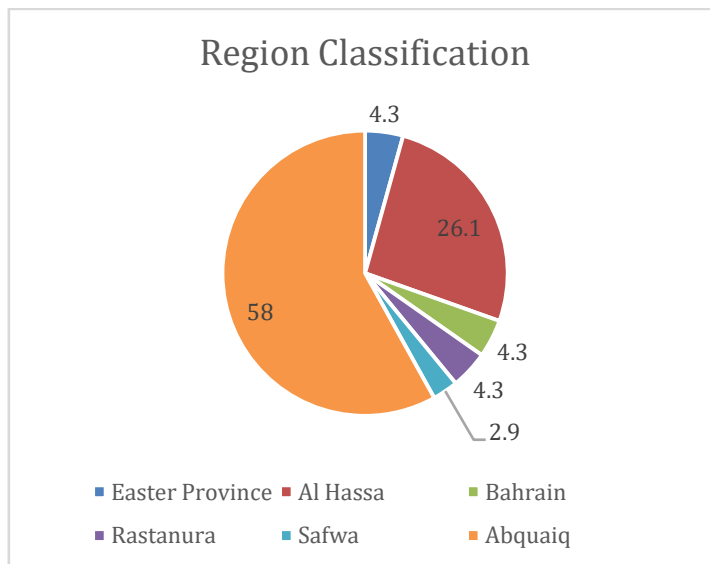
Figure 6: Classification of Region

Table 7: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	69	17	71	53.26	11.535
Valid N (list wise)	69				

Table 8: Paired Samples Statistics

	Mean	N	Std. Deviation	Std. Error Mean

Pair 1	Pre total	8.5797	69	3.07459	.37014
	Post total	13.5507	69	1.06462	.12817

T-test = 13.00; P-value = 0.000

From the above table we have arrived a significant difference (Since P-value < 0.05) between pre score knowledge and post score knowledge by applying paired t-test. So we conclude that the knowledge is more effective given to diabetic patients.
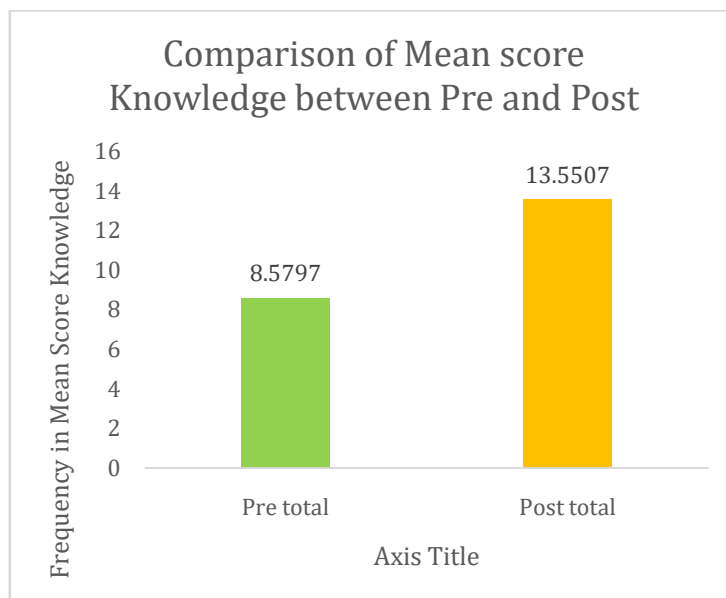
Figure 7: Comparison of Mean score Knowledge between Pre and Post

Discussion

The implementation of the structured teaching education is to strengthen the knowledge and practice of Diabetes type 2 patients to create the desirable knowledge on foot care in order to prevent diabetes complications. We came to know that even 10 to 15 minutes of time spent to individual patient education showed a significant improvement on their foot care practice. In this research, the significant difference between pre and post knowledge score proves that the education and regular attention on diabetic patients may prevent disability and reduce medical care expenditure in future. Furthermore, a special training program may lead to bright future for diabetic patients to reduce the foot complications. Providing resources and special training of health providers will ensure regular foot care and respective education should be a priority of any strategy to avoid diabetes. These research findings ensure that foot care education and regular foot examination as strategies for preventing foot ulcers. Patient without foot ulcers will never develop foot complications through preventive practices with their knowledge on foot care. This study emphasize that foot care knowledge is a must one for all the diabetic patients to avoid foot complications. These results also insisting the need to increase foot care education and to organize proper diabetic foot clinics in the hospitals or health care sectors.

Patient education playing an important role on preventing foot complications among diabetic patients. Therefore this study result emphasize that nurses must take part in the preparation and application of training program to improve self-care behaviors of patients and their future betterment.

Conclusion

After analyzing the collected data from the questionnaire and transforming them into meaningful results, the researcher would then be able to produce reliable recommendations that could solve the issues that were highlighted after analyzing the respondents pre and post knowledge. Since the study shows significant results on education to improve the foot care knowledge, it is also recommending conducting both theory and practical based training program to improve patient's knowledge more for avoiding foot complications. Finally, nurses should be encouraged to use the information they have acquired for the education of diabetic patients. To all public with diabetes must receive education on foot care and continuous adherence of the foot by the health care providers which will eventually give a bright future to all people in the country.

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