Objective: This study aims to assess the behaviors of diabetic males towards their foot care at Al-Manhal Center of Family Practice, Aseer Region, KSA.

Methodology: A cross-sectional study was conducted for male diabetics in the Aseer region, KSA, during the first quarter of the year 2004. A questionnaire and physical examination of the foot were used to assess their behaviors towards foot care.

Results: All the male diabetic patients (107) who attended during the study period were assessed. Mean age was 58 years, mean duration of DM was 10 years. Good diabetic control was 24%. 37% did not know the negative effect of DM on the feet, 9-22% had different symptoms of diabetic foot, 53% checked their feet regularly, 31% had fungal infection while an absence of pulse was detected in 7%.

Conclusion: This study revealed that many diabetics had negative behaviors towards foot care. There is a need for intensive health education and regular assessment in order to detect, prevent and manage diabetic foot as early as possible.

Key Words: Diabetes, Foot Care, Behaviors, Family Practice, Aseer Region.

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INTRODUCTION

Diabetes Mellitus (DM) is one of the most common chronic health problems affecting Saudi adults. According to epidemiological studies conducted during the last decade, the prevalence of DM has increased from 5% to 23.7%. One of the serious complications of DM leading to high mortality and morbidity and high cost is diabetic foot (DMF). DMF is defined as: various degrees of neurological and vascular abnormalities affecting the foot and the tendency towards deep foot tissue destruction, ulceration...
and infection. DMF was found to affect 10-15% of diabetics. Diabetic foot occurs as a result of many risk factors which include long duration of diabetes, poor metabolic control, foot deformities, older age, peripheral vasculo-pathy and poor knowledge of diabetics.

One national report mentioned that DMF was found to be the major cause of the amputation of lower limbs in Saudi Arabia. To make diabetics active participants of their care, it is vital to explore their knowledge and behaviors towards DM care. The aims of this study were to assess behaviors of male diabetics towards foot care and assess the presence of DMF among those attending Al-Manhal Family Practice in the Aseer region, Saudi Arabia.

MATERIALS AND METHODS
This 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. This center is a recognized setting for undergraduate and postgraduate training in Family Medicine. In this center, care for patients suffering from diabetes mellitus, hypertension and asthma is conducted through chronic diseases mini-clinics established in 1998. Clinical guidelines issued by the MOH are followed in caring for these health problems.

To achieve the objectives of this study, the investigator designed a questionnaire consisting of two main parts; the first part was about socio-demographic and some clinical data, the second part consisted of 12 questions about knowledge, and behaviors of diabetic patients towards diabetic foot. Physical examination of their feet was conducted and the results were recorded on the questionnaire form. This study was approved by Research Committee of the Joint Program of Family Medicine.

Before conducting the study, ten diabetic patients were interviewed to discover any possible difficulties in the questionnaire. Verbal consent was obtained from all patients. The completion of the questionnaire was carried out as part of comprehensive care of diabetic males who attended our practice in the first quarter of 2004. In order to make the questionnaire more reliable and valid, the interview and clinical examination were conducted by the same physician. All diabetic males who attended during that period were interviewed and examined. Diabetic females were excluded from this study as they were followed up in the female department by female doctors.

Diabetes was considered as good control if the fasting blood sugar (FBS) was <110 mg/dl, fair control if FBS = 110-140mg/dl and poor control if FBS> 140 mg/dl as defined by the MOH chronic diseases guideline. Weight was considered as normal if body mass index BMI was 18-24.9 kg/m², overweight if BMI ≥25<29.9 kg/m² and obese if BMI> 30 kg/m². Clinical examination was conducted as follows: palpation dorsalis pedis arteries in both feet. Vibrating tuning fork (128Hz) was put on the plantar surfaces of the big toes to test for vibration sense. Ten grams monofilament was put at the plantar aspects of digits and heels to test for pressure senses and blunted neuro-pin used to test for pain sense.

Physical examination was considered abnormal if any one of the following findings was detected: presence of fungal infection, absence of dorsalis pedis pulse, loss of vibration, position or pain sensation in feet. Data entry and analysis were managed by using SPSS version 15. Chi-square was used to test for statistical significance and p-value was considered significant if it was less than 0.05.

RESULTS
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 our practice.

Socio-demographic and clinical data of the patients are shown in Table 1. 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.

Table 2 depicts behaviors of diabetics towards foot care. 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 dorsalis pedis pulse were found in 6% of patients. Fungal
Table 1: Socio-demographic and some metabolic characteristics of male diabetics at Al-Manhal Family Practice, Abha, KSA, 2004

| Item                                      | No. (%)       |
|-------------------------------------------|---------------|
| Age (Mean ± SD)                           | 58 ± 10 years |
| Duration of DM (Mean ± SD)                | 10 ± 6 years  |
| Nationality:                              |               |
| Saudi                                     | 93 (87)       |
| Non-Saudi                                 | 14 (13)       |
| Educational status:                       |               |
| Educated                                  | 75 (70)       |
| Illiterate                                | 32 (30)       |
| Smoking:                                  |               |
| Smoker                                    | 6 (6)         |
| Non-smoker                                | 101 (94)      |
| FBS (md/dl)                               | 166 ± 52      |
| BMI (kg/m²)                               | 27.7 ± 3.3    |
| Diabetes control:                         |               |
| Good                                      | 26 (24)       |
| Fair                                      | 47 (44)       |
| Poor                                      | 34 (32)       |
| Degree of obesity                         |               |
| Normal weight                             | 27 (25)       |
| Overweight                                | 51 (48)       |
| Obese                                     | 28 (26)       |

SD=Standard deviation, DM=Diabetes Mellitus, FBS=Fasting blood sugar, BMI=Body Mass Index, Kg=Kilogram

infection was more common in diabetics with long duration of DM (p=0.02).

DISCUSSION
To minimize the complications of DM, emphasis should be put on the importance of the active role of diabetics in their general self-care, particularly in foot care. In this study, 57% of patients knew that DM had a negative effect on the foot. Previous studies from the Aseer region found that poor compliance to drugs and advice on diet in 21% of diabetics was due to the lack of knowledge about DM. Only 13.6% of diabetics were provided with health education materials about DM and 39% were educated on the diabetic foot.8-10 In Libya, Bosseri found that 31% of diabetics were not aware of the negative effect of DM on the foot.11 This flaw in their knowledge was the result of the lack of the infrastructure necessary for the conduct of efficient health education program for diabetics as was reported previously by Al-Khaldi and Al-Sharif.12

Symptoms of peripheral neuropathy such as hotness, numbness and foot pain were reported by 22%, 11% and 9% respectively. However, signs of diabetic neuropathy were not detected in any patient. In Jordan, Jbour et al, found that the loss of the sense of position and vibration in diabetics were 13% and 19% respectively.13 The differences could be due to many factors such as duration of DM, level of metabolic control and sample size.

Many organizations recommended self-care of the foot as a means of early detection of any abnormality. In this study, about half the diabetics (47%) did not check on their feet at all and less than one fifth (19%) checked their feet daily, 18% walked barefooted. Those findings are close to those reported of diabetics in Tripoli where 28% of diabetics inspected their feet daily and 24% walked on bare feet.11

Table 2: Behaviors towards foot care and foot clinical findings among male diabetics at Al-Manhal Family Practice, Abha, KSA, 2004

| Items                                      | No. (%)       |
|-------------------------------------------|---------------|
| Diabetes mellitus has negative effect on feet |               |
| Yes                                       | 61 (57)       |
| No                                        | 6 (5)         |
| Do not know                               | 40 (37)       |
| Feeling numbness in feet                  |               |
| Yes                                       | 12 (11)       |
| No                                        | 95 (89)       |
| Feeling hotness in feet                   |               |
| Yes                                       | 24 (22)       |
| No                                        | 85 (78)       |
| Feeling pain in feet                      |               |
| Yes                                       | 10 (9)        |
| No                                        | 97 (91)       |
| Checking of foot                          |               |
| Daily                                     | 20 (19)       |
| Every other day                           | 14 (13)       |
| Every three days                          | 9 (8)         |
| Once per week                             | 11 (10)       |
| Not at all                                | 53 (47)       |
| Walking on bared feet                     |               |
| Yes                                       | 19 (18)       |
| No                                        | 88 (82)       |
| Drying foot after wadue                   |               |
| Yes                                       | 34 (32)       |
| No                                        | 73 (68)       |
| Using cream to smooth feet                |               |
| Yes                                       | 36 (34)       |
| No                                        | 71 (66)       |
| Nail trimming                             |               |
| Proper                                    | 86 (80)       |
| Improper                                  | 21 (20)       |
| Foot hygiene                              |               |
| Good                                      | 105 (98)      |
| Bad                                       | 2 (2)         |
| Fungal infections                         |               |
| Present                                   | 31 (29)       |
| Absent                                    | 76 (71)       |
| Foot fissures                             |               |
| Yes                                       | 18 (17)       |
| No                                        | 89 (83)       |
| Peripheral pulse                          |               |
| Present                                   | 100 (93)      |
| Absent                                    | 7 (7)         |
| Peripheral sensation                      |               |
| Present                                   | 107 (100)     |
| Absent                                    | 0 (0)         |
These findings reflected poor self-care among diabetics. Intensive effort in health education is required to reinforce self-care among diabetics.

There was good foot hygiene in 98% of the diabetics. This good finding was the result of washing of the feet daily before prayer (wadue). However, the practice of drying the feet after wadue was low (32%). The moisture left between the toes heightened the possibility of the occurrence of infections. Coarse skin of the feet and fissures were found in 31% and 17% respectively. These findings did not differ from those reported from Jordan (35% and 17%) but higher than what was reported from Tripoli (cracked skin 24%). The differences may be due to many diabetics (34%) used creams to soften their feet.

Healthy nail trimming was practiced by 80% of the patients, which could be explained by the fact that most people in our community cut their nails regularly as a habit rather than as the result of the recommendation of health professionals.

Fungal infections were detected in 29% of diabetics; this figure is similar to that found elsewhere (29%) by Bosseri. This high rate could be explained by frequent foot washing (five times daily) for prayer making the feet a good environment for such infections particularly among patients who do not dry their feet after washing.

Although, we could not find any significant association between the presence of fungal infection, foot hygiene and strict metabolic control (p>0.05), these findings should be interpreted carefully as we used fasting blood sugar as a tool for measuring metabolic control instead of glycosylated hemoglobin which was unavailable at our practice. However, we found that more fungal infections were found among those diabetics who had had DM for more than ten years than those who had had it for less than ten years (p=0.02). This association could be explained by duration of DM which was found a strong contributing factor for most diabetes-related complications including infections. Walking on bare feet can cause trauma particularly for patients with diabetic peripheral neuropathy. In this study, 18% of the diabetics walked on bare feet, which is lower than the 24% found in Libya. This traditional habit should be discouraged in all patients.

Absent peripheral pulse was found in 7% of our patients. This figure is lower than that reported from Bahrain (11.8%), Jordan (13%) and higher than that reported from North Africa (3%). These differences could be due to the study samples, methods used for assessment and duration of DM among population under the study. Although this figure is low, clinicians should adhere to the guidelines of the Diabetes Association which insist on an annual check-up for peripheral vascular diseases (PVD).

In conclusion, we found that a high percentage of diabetics were unaware of the negative effect of DM on the foot, which resulted in unhealthy behavior towards foot care. Regular check-ups for the feet are emphasized in order to detect and to treat any abnormality before diabetic foot can develop. This study presented a good opportunity to educate all patients on foot care.

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