



# Foot ailments during Hajj: A short report



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**Abstract** A study of ailments of the feet in pilgrims of Hajj revealed that 31% of them suffered from blisters, and the prevalence was five times higher in females. The presence of comorbidity (diabetes, obesity and advanced age) warrants immediate attention to them to avoid serious complications.

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## 1. Introduction

The Hajj is the largest pilgrimage of Muslims around the world that happens once a year in Mecca, Kingdom of Saudi Arabia (KSA). Approximately, 2–3 million people arrive each year to perform the rituals which are time bound. The *Tawaf*

(the circumambulation seven times around the Kaaba) can range from 1.4 km to 4.1 km (depending on the crowd and which floor it is performed). The *Sa'ay* (running or walking seven times between the hills of Safa and Marwah) is approximately 2.8 km [1]. During the *Ramy al-Jamarat* (stoning of the pillars), for which the pilgrim walks from his tent in Mina to Jamarat bridge, the walking distance varies depending up on the location of the tent. On an average, rituals of Hajj include long distance travel by foot (that involves walking 5–15 km some days) [2]. Skin diseases were sparingly studied in the past [3,4] and there is a lack of

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scientific evidence concerning feet problems among Hajj pilgrims. In 1997, a survey conducted among 1101 pilgrims randomly selected in Mina from all the Hajj pilgrims resulted in a 23% prevalence of cut wounds in their feet [5]. In a more recent study in 2013, conducted at a mobile podiatric clinic at Mina, 31% of the consulting patients complained of blisters on their feet [2]. As a part of a global study measuring the health problems of French pilgrims [6,7], information specific to feet problems with respect to walking during the Hajj was collected.

## 2. Materials and methods

Data were obtained during the 2013 Hajj from a cohort that was traveling from France to Mecca, with a specialized travel agency in Marseille, from October 3 to October 24, 2013. A medical doctor and an investigator were traveling with the cohort to document the health problems during the travel. A post-travel questionnaire was systematically completed in a face-to-face interview by the investigator 2 days prior to returning to France. Symptoms pertaining to feet were collected by the use of an open-ended question. If they had consulted the doctor, the exact diagnosis was confirmed. If not, diagnosis was retrospectively established by the traveling doctor. Walking distances during the entire pilgrimage were estimated by the investigator.

All statistical analyses were performed on STATA12. Pearson's Chi-square test and Fisher's exact test, as appropriate, were applied to analyze the categorical variables. All  $p$  values of 0.05 or less were considered significant. Age was categorized as below and above 60 years. Body mass index (BMI) was calculated as weight (in kilograms) over square of the height (in meters). It was grouped according to guidelines given by the Center for Disease Control ([www.cdc.gov](http://www.cdc.gov)): below 18.5: underweight, 18.5–24.9: normal, 25–29.9: overweight, above 30: obese. BMI, sex, diabetes and age of the pilgrim were considered as major predictor variables for blisters on feet.

## 3. Results

The cohort consisted of 129 pilgrims with a female to male ratio of 1.5:1 and a mean age of 62 years. Around two-thirds (63.6%) of the cohort was above the age of 60 years. The prevalence of general chronic diseases was as follows: hypertension (33.3%), diabetes (26.4%), chronic cardiac diseases (8.5%) and chronic respiratory diseases (3.9%).

The mean BMI for the entire cohort was 27.9 kg/m<sup>2</sup> (95% CI = 27.1–28.8). None of the pilgrims were

underweight or had a BMI below 18.5. The mean BMI for females (28.9; 95% CI = 27.7–30.2) was significantly higher than males (26.5; 95% CI = 25.6–27.3). Almost one third (29.5%) of the cohort had a BMI over 30 and slightly more than one third (37.2%) had a BMI in the range of 25–30. As shown in Fig. 1, the prevalence of obesity in females was 3 times more than in males ( $p = 0.005$ ).

The estimated total distance walked during the entire pilgrimage was about 58 km. This included *Tawaf* (total of 1.4 km per *Tawaf*, done thrice = 4.2 km), *Sa'ay* (2.8 km per *Sa'ay*, done twice = 5.6 km), *Jamarat* (total of 8 km round-trip from the tents to the Jamarat bridge, done 4 times equals 32 km) and miscellaneous walking to get to the pick-up points of the tour (about 16 km).

In the cohort, 31.8% reported blisters on the feet during the post-Hajj questionnaire (Table 1). The prevalence was statistically higher in females and in pilgrims who were overweight or obese. The results were significant when the normal BMI group or overweight group was compared with the obese, and not significant between the normal BMI group and the overweight group (Fig. 2).

Among the diabetic pilgrims, 29.4% reported blisters on their feet as compared with 32.6% among the non-diabetic pilgrims; however, the difference was not statistically significant (Table 1).

Only one pilgrim, who was female, obese and more than 60 years old, reported an infected blister of the foot. One male pilgrim who was obese and over 60 years old reported mycosis of his feet. Also, 10.9% of the cohort reported sore legs and feet (Table 2). Two pilgrims reported tendonitis and edema of their legs during Hajj. There was one case of necrotizing diabetic foot that was reported.

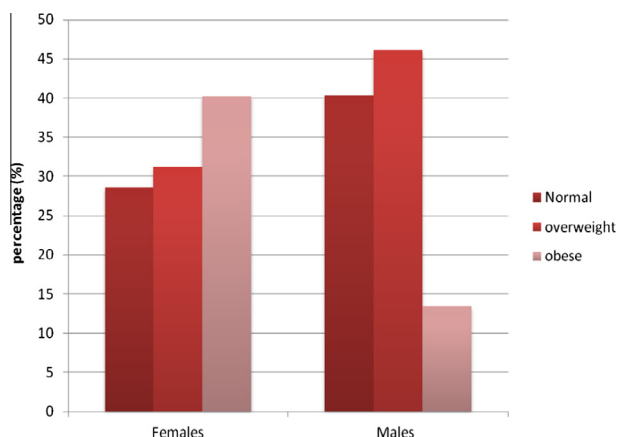


Fig. 1 Distribution of body type (as per body mass index) of males and females in Hajj pilgrims in 2013.

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