Utilization of Primary Health Care Services during Hajj

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ABSTRACT

Objectives: The annual pilgrimage to Makkah (Hajj) is a large gathering of Muslims from all over the world. Hajj (Hajjais) vary considerably in their demographic characteristics, health-related factors and their underlying health status. As a result, they vary in their medical needs. The objectives of this study were to identify the pattern of workload at the health care centers in Mina, where Hajjasis camp for 5 days, and the age, sex and nationality of the common diseases among Hajjais at these primary health care centers.

Methods: A systematic random sample was selected from the records of patients who visited 15 out of the 22 health care centers and one of 3 hospitals serving in Mina. The nationalities of Hajjais were divided into 8 groups according to the administrative division of the Ministry of Hajj. Illnesses were also divided into 8 groups according to the systems affected.

Results: Out of 1,323 records reviewed of more than 44 nationalities, the overall sex ratio was about 2:1. About 94% of all patients across different nationalities were 15 years or older except Hajjais from GCC (2%) and Iran (1%). The workload varied considerably between the health care centers. The workload at the primary health care centers in Mina increased steadily and rapidly, reaching its peak on the 12th of Dhul Hijja.

The workload showed consistent daily bimodal pattern; the busiest periods were between 6-10 am and 7-10 pm. These primary health care centers were located close to Al-Jamarat area, serving Hajjais from southeast Asia and Africa. The leading causes of morbidity among Hajjais diagnosed at the primary health care centers in Mina were respiratory diseases (49% of all illnesses), gastrointestinal illnesses (11%), skin diseases (8%) and illnesses of the muscles and joints (7%). Heat exhaustion cut wounds and chronic illnesses such as diabetes mellitus and hypertension constituted less than 2% each.

Conclusion: The variations in the workload at the primary health care centers could help decision makers in redistribution of the health manpower between and within primary health care centers to design a more efficient schedule for General Practitioners and other medical staff within primary health care centers. The remarkably weaome physical effort a Hajjai would undergo could probably explain the increased utilization of primary health care centers services by females. Occurrence of illnesses could reflect some undesirable risk behaviors among certain nationality groups.

Keywords: Pilgrimage (Hajj), utilization of health services, pattern of diseases.

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To the editor:
The annual pilgrimage to Makkah (Hajj) is a large gathering of Muslims from all over the world attending an international attraction. On the other hand, Hajjais (pilgrims) are entirely different from involuntary massive movements of refugee or displaced populations following worsening political or environmental conditions even though they share

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931
many similarities with them. Like displaced communities, mentally stressed Hajjees may walk up to 30 kilometers on foot in a 24-hour period to visit certain holy places in extremely crowded conditions, carrying loads of personal belongings, living in camps away from their home countries, and using medical services provided by foreign health personnel. Outbreaks of acute infectious diseases and disasters could occur at any point of time; there are many reported outbreaks of cholera, meningococcal meningitis, food poisoning or eruption of widespread devastating fire catastrophes.

Although it is unlikely to see large numbers of very young children among Hajjees, there are considerable numbers of the elderly who are vulnerable to infections. The diversity of the Hajj population poses many communication constraints. Hajjees vary considerably in their socio-demographic characteristics, health-related behaviors and their underlying health status. As a result, they vary in their medical needs. The number of pilgrims has greatly increased in the last 4 decades. In 1951, only 100,000 foreign Hajjees performed the Haj, compared to over 1.5 million Hajjees in 1995. In addition to the institution of numerous preventive public health measures, the Saudi health authorities provide free medical services for all religious visitors, including dispensed medicines and cost of hospitalization. However, as Hajj is an expected event in an affluent country, preparedness and many interventions have greatly improved the living conditions of Hajjees. The Saudi government spares no effort to safeguard against potential undesirable accidents by providing acceptable shelter, a safe potable water supply, affordable foods, and proper management of excreta disposal. Despite these arrangements for organization and management of the Hajj event, there is an increasing need for better understanding of the medical needs of Hajjees during Hajj. Such information is needed for planning new medical programs and evaluation of ongoing medical services. There are few studies that looked at the pattern of Hajj associated diseases.

The objectives of this study were to identify the pattern of the workload at the primary health care centers (PHCCs) in Mina, and the age, sex and nationality distribution of the common illnesses among Hajjees treated at these PHCCs.

Methods. Background. Mina is a holy area that lies at the outskirts of Makkah city. Over 2 million Hajjees camp in Mina for 3 to 5 days. The camping area is well defined and is about 10 sq. km (about 4 km long and 2.5 km wide). The camping Hajjees are served with 22 PHCCs and 3 hospitals. These PHCCs and hospitals are strategically located throughout Mina. The catchment area for each PHCC has a radius of about 200 meters. PHCCs are permanent buildings of similar design with characteristic green domes and displayed signs. These PHCCs function only for 2 weeks a year during the Hajj season and are closed thereafter. Just before every Hajj season these PHCCs are cleaned and their functions restored. There are about 20-35 health workers assigned to each PHCC. Although there are some variations between PHCCs, the staff of each PHCC consists of at least 1 administrator, 5 general practitioners, 1 laboratory technician, 3 assistant pharmacists, 4 male nurses, 2 to 3 female nurses, I clerk, 2 servants, and 1 guard. The medical personnel work for 12-hour shifts. The number of doctors working at the PHCCs is increased on the morning of the 10th of Dhul Hijja to cope with the overwhelming increase in the workload on that day. Doctors serving during the Hajj season are more likely to have accumulated significant experience from working during previous Hajj seasons. Nevertheless, all doctors working the Hajj seasons are usually experienced with diseases associated with the Hajj and are usually exposed to a special refresher short course or seminars just before the Hajj season.

Every 4 or 5 PHCCs are supervised by 1 PHCC and all PHCCs are monitored and managed by a central office, which is run by a special crew. An additional 50% of the medical personnel is kept as back-up staff and are redistributed according to the density of the workload. PHCCs provide pure ambulatory curative services 24 hours a day from the 7th of Dhul Hijja through the 12th Dhul Hijja. Some PHCCs are furnished with ambulance services. Generally PHCCs are well equipped for the provision of simple surgical procedures and emergency care. Complicated cases are referred to hospitals. Nevertheless, some of the PHCCs are furnished with beds for short admissions and the management of illnesses such as heat exhaustion. Expatiate workers, multi-lingual Mutawwis (guides), and interpreters help in overcoming language barriers. During the Hajj season, the Saudi Ministry of Health (MOH) uses special forms to facilitate the management of patients reporting to the PHCCs in Mina and other holy places. The form is designed to fit on one page, and is arranged in 3 sections. The first section includes demographic data: age, sex, nationality, date of arrival to Makkah, date and time of visit to the PHCC, and the clinic visited. The second section includes diagnoses to be identified by the treating doctor according to the International Classification of Diseases (ICD-9). The third section includes the prescribed treatment. All of the 3 sections are pre-coded and health personnel simply check the appropriate statement, diagnosis, or prescription.

Sampling. With the aid of a map of Mina, our investigator visited 15 of the 22 PHCCs and 1 of the
3 hospitals serving Hajj as in Mina. The PHCCs encompassed all the functioning PHCCs in Mina except those in the Al-Muassel area of Mina, which the investigator could not visit for logistical reasons. Turks, Europeans, and Hajj as from Southeast Asia primarily occupy the Al-Muassel area. A systematic random sample was selected by the following method: 1% of all forms was drawn from boxes that contained the forms of all patients seen at the health center during the period between the 7th through the 12th of Dhu al-Hija, 1418 H (1998 G). In each PHCC, we started by randomly selecting a form from the first 100 forms found in that PHCC; this was followed by selecting the 100th of all patients’ forms. Similarly, a systematic sample was drawn from the hospital included in the study. The forms were not arranged in any special order.

**Data entry and analysis.** Epi Info software (version 6.04b) was used for data entry and analysis, and Harvard Graphics (version 3.0) was used to make graphs. Nationalities of Hajj as were divided into 8 groups according to the administrative organization of the Ministry of Hajj. Illnesses were also regrouped into 8 groups according to the systems affected. Preliminary analysis showed there were no differences between males and females, so they were grouped together. Some of the patients’ records were incomplete: the age group of 280 (21%) of the patients and the sex of 54 (4%) were not recorded in the patients’ forms; therefore, these patients were removed from analyses that necessitated age/sex distributions.

**Results.** According to the official records there were 125,483 visits to the PHCCs in Mina during the period between the 8th and the 14th of Dhu al-Hija, 1418 H (1998) inclusive. Out of 1,323 records reviewed, there were 823 (62%) males and 440 (32%) females, the gender of 54 (4%) patients was not recorded. The overall sex ratio was about 1:2. The sample yielded patients from more than 44 nationalities. Unlike other Hajj as, the sex ratio of the Iranian patients visiting PHCCs in Mina was reversed; the male/female sex ratio of patients was 0.2. The workload varied considerably between PHCCs. The busiest PHCC was those numbered 22, 15, 6, 17, and 20 (Figure 1). These PHCCs were located close to the Al-Muassel area serving Hijas from Southeast Asia and Africa. The workload of the PHCCs in Mina increased steadily and progressively reaching its peak on the 12th of Dhu al-Hija (Figure 2). The workload showed a consistent daily bimodal pattern; the busiest periods were between 6-10 am and 7-10 pm (Figure 3). However, the workload was relatively low in the morning of the 10th and the evening of the 12th of Dhu al-Hija. Moreover, on the 12th of Dhu al-Hija, the

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**Figure 1.** Daily workload at different primary health care centers (PHCCs) at Mina area, Makkah City, Saudi Arabia, during pilgrimage to Makkah (Hajj), 1418 (Hijra) - 1998 (Gregorian).

**Figure 2.** Daily distribution of number of pilgrims (Hajj as) visiting primary health care centers at Mina area, Makkah City, Saudi Arabia, during pilgrimage to Makkah (Hijra), 1418 (Hijra) - 1998 (Gregorian).

**Figure 3.** Daily distribution of number of pilgrims (Hajj as) showing busiest distribution of visits to primary health care centers at Mina area, Makkah City, Saudi Arabia, during pilgrimage to Makkah (Hijra), 1418 (Hijra) - 1998 (Gregorian).
workload started about 2 hours earlier. Table 1 shows the age/sex distribution of the patients. Of all patients whose age and sex were known, 26 (2%), 95% CI 1%-3%) were less than 15 years of age, 507 (40%, 95% CI 37%-43%) aged 15-44 years, 384 (30%, 95% CI 28%-33%) aged 45-64 years, and 111 (9%, 95% CI 7%-10.5%) were aged 65 years or older. Some 51 (14%) out of 354 female patients were 65 years or more as compared with 60 (9%) out 674 male patients; the difference was statistically significant (p<0.05, test between 2 proportions). About 10-12% of all patients across different nationalities were 65 years or older except Hajjies from GCC (2%) and Iran (17%). However, 39 (71%) of the patients from GCC were aged 25-44 years (Table 2). Of all patients, 1227 (93%, 95% CI 91%-95%) were Hajjies; 960 (73%, 95% CI 70%-75%) were from outside Saudi Arabia, 120 (9%, 95% CI 8%-11%) were residents of Saudi Arabia, 60 (4.5%, 95% CI 3.5%-6%) were Saudis, and 183 (14% 95% CI 12%-16%) had unrecorded residency status. Diagnosis of a single illness was made on 1140 (86%) patients, whereas 175 (13%) patients presented with 2 diagnoses and 8 (1%) patients with 3 diagnoses. The leading causes of morbidity among Hajjies diagnosed at the PHCCs in Mina were respiratory diseases (49% of all illnesses), gastrointestinal illnesses (11%), skin diseases (8%) and diseases of the muscles and joints (7%). Heat exhaustion, cut wounds and chronic illness such as diabetes mellitus and hypertension constituted less than 2% each. However, the diagnoses of 305 (20%) patients were unspecified and were referred to as “others.” Tables 3 and 4 show the age and nationality distribution of different diseases. Acute respiratory infections (ARI) seen at the PHCCs were first reported among nationals from GCCs and other Arab countries on the morning of the 8th of Dhu Hijja. In the evening of the same day a wave of ARI was reported among Hajjies from the Indian sub-continent. However, ARI cases started to appear among Hajjies from Iran and sub-Saharan Africa 2 days later, on the 10th of Dhu Hijja (Figure 4). The peak of ARI among Hajjies from different nationalities was noted on the 12th of Dhu Hijja. There was a sharp increase in the number of acute illnesses of the gastrointestinal tract (GIT) in Hajjies from all nationalities during the period between the 10th through 12th of Dhu Hijja. However, illnesses of the GIT were first reported among Hajjies from Arab countries other than GCC. Cases of acute GIT illnesses among Hajjies from Iran stated to appear on the 12th of Dhu Hijja. Regardless of the nationality of Hajjies, the majority of cases were consistently reported on the 12th of Dhu Hijja.
Table 3 - Distribution of illness during Hajj diagnosed at primary health care centers according to age group of Hajjees, Mina, 1418H (1998).

<table>
<thead>
<tr>
<th>Age groups</th>
<th>ARI* N (%)</th>
<th>Gastro-intestinal N (%)</th>
<th>Skin N (%)</th>
<th>Muscles &amp; joints N (%)</th>
<th>Chronic illnesses** N (%)</th>
<th>Wound N (%)</th>
<th>Heat exhaustion N (%)</th>
<th>Others N (%)</th>
<th>Total*** N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 14</td>
<td>10 (32.0)</td>
<td>4 (13.0)</td>
<td>1 (3.0)</td>
<td>2 (6.5)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (3.0)</td>
<td>13 (42.0)</td>
<td>31 (2.0)</td>
</tr>
<tr>
<td>15 - 24</td>
<td>31 (55.0)</td>
<td>8 (14.0)</td>
<td>4 (7.0)</td>
<td>3 (5.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (2.0)</td>
<td>9 (16.0)</td>
<td>56 (4.0)</td>
</tr>
<tr>
<td>25 - 44</td>
<td>306 (57.0)</td>
<td>37 (7.0)</td>
<td>49 (9.0)</td>
<td>42 (8.0)</td>
<td>7 (1.0)</td>
<td>8 (1.5)</td>
<td>8 (1.5)</td>
<td>77 (14.0)</td>
<td>534 (35.0)</td>
</tr>
<tr>
<td>45 - 64</td>
<td>207 (46.0)</td>
<td>60 (13.0)</td>
<td>26 (6.0)</td>
<td>39 (9.0)</td>
<td>13 (3.0)</td>
<td>11 (2.0)</td>
<td>6 (1.0)</td>
<td>89 (20.0)</td>
<td>451 (30.0)</td>
</tr>
<tr>
<td>65+</td>
<td>59 (39.0)</td>
<td>12 (8.0)</td>
<td>29 (19.0)</td>
<td>12 (8.0)</td>
<td>4 (3.0)</td>
<td>2 (1.0)</td>
<td>5 (3.0)</td>
<td>28 (18.5)</td>
<td>151 (10.0)</td>
</tr>
<tr>
<td>Age unknown</td>
<td>123 (42.0)</td>
<td>41 (14.0)</td>
<td>6 (2.0)</td>
<td>14 (5.0)</td>
<td>5 (2.0)</td>
<td>6 (2.0)</td>
<td>6 (2.1)</td>
<td>89 (31.0)</td>
<td>290 (19.0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>736 (49.0)</td>
<td>162 (11.0)</td>
<td>115 (8.0)</td>
<td>112 (7.0)</td>
<td>29 (2.0)</td>
<td>27 (2.0)</td>
<td>27 (2.0)</td>
<td>305 (20.0)</td>
<td>1513 (100.0)</td>
</tr>
</tbody>
</table>

*Acute respiratory infection. **Chronic illness included diabetes mellitus and or hypertension.
***Column total and percentages add to 100%
174 patients presented with two illnesses and 8 with 3 illnesses, thus total exceed 1323, the number of patients' records.

Table 4 - Distribution of illness during Hajj diagnosed at primary health care centers according to nationality of Hajjees, Mina, 1418H (1998).

<table>
<thead>
<tr>
<th>Nationality</th>
<th>ARI* N (%)</th>
<th>Gastro-intestinal N (%)</th>
<th>Skin N (%)</th>
<th>Muscles &amp; joints N (%)</th>
<th>Chronic illnesses** N (%)</th>
<th>Wound N (%)</th>
<th>Heat exhaustion N (%)</th>
<th>Others N (%)</th>
<th>Total*** N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey, North America, Europe, Australia</td>
<td>2 (20.0)</td>
<td>3 (30.0)</td>
<td>0 (0.0)</td>
<td>3 (30.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (10.0)</td>
<td>1 (10.0)</td>
<td>10 (1.0)</td>
</tr>
<tr>
<td>Gulf countries</td>
<td>50 (68.0)</td>
<td>4 (5.0)</td>
<td>3 (4.0)</td>
<td>4 (5.0)</td>
<td>1 (1.0)</td>
<td>1 (1.0)</td>
<td>1 (1.0)</td>
<td>10 (13.5)</td>
<td>74 (5.0)</td>
</tr>
<tr>
<td>Iran</td>
<td>77 (33.0)</td>
<td>17 (7.0)</td>
<td>22 (9.0)</td>
<td>17 (7.0)</td>
<td>2 (1.0)</td>
<td>0 (0.0)</td>
<td>2 (1.0)</td>
<td>96 (41.0)</td>
<td>233 (15.0)</td>
</tr>
<tr>
<td>Other Arab countries</td>
<td>159 (44.0)</td>
<td>47 (13.0)</td>
<td>40 (11.0)</td>
<td>26 (7.0)</td>
<td>7 (2.0)</td>
<td>15 (4.0)</td>
<td>12 (3.0)</td>
<td>57 (16.0)</td>
<td>363 (24.0)</td>
</tr>
<tr>
<td>South East Asia</td>
<td>10 (67.0)</td>
<td>2 (13.0)</td>
<td>0 (0.0)</td>
<td>1 (7.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>1 (7.0)</td>
<td>1 (7.0)</td>
<td>15 (1.0)</td>
</tr>
<tr>
<td>Indian Sub-continent</td>
<td>237 (55.0)</td>
<td>42 (10.0)</td>
<td>26 (6.0)</td>
<td>39 (9.0)</td>
<td>2 (0.5)</td>
<td>5 (1.0)</td>
<td>4 (1.0)</td>
<td>76 (18.0)</td>
<td>431 (28.5)</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>97 (57.0)</td>
<td>18 (10.5)</td>
<td>11 (6.0)</td>
<td>9 (5.0)</td>
<td>9 (5.0)</td>
<td>1 (1.0)</td>
<td>2 (1.0)</td>
<td>24 (14.0)</td>
<td>171 (11.0)</td>
</tr>
<tr>
<td>Unknown</td>
<td>104 (48.0)</td>
<td>29 (13.0)</td>
<td>13 (6.0)</td>
<td>13 (6.0)</td>
<td>8 (4.0)</td>
<td>5 (2.0)</td>
<td>4 (2.0)</td>
<td>40 (18.5)</td>
<td>216 (14.0)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>736 (49.0)</td>
<td>162 (11.0)</td>
<td>115 (8.0)</td>
<td>112 (7.0)</td>
<td>29 (2.0)</td>
<td>27 (2.0)</td>
<td>27 (2.0)</td>
<td>305 (20.0)</td>
<td>1513 (100.0)</td>
</tr>
</tbody>
</table>

*Acute respiratory infection. **Chronic illness included diabetes mellitus and or hypertension.
***Column total and percentages add to 100%
174 patients presented with two illnesses and 8 with 3 illnesses, thus total exceed 1323, the number of patients' records.
Utilization of PHCC services during Hajj ... El-Bushra & Abodahish

Figure 4 - Distribution of respiratory tract infections by nationality during pilgrimage to Makkah (Hajj), Mina area, Makkah City, Saudi Arabia, 1418 (Hijra) - 1998 (Gregorian).

Figure 5 - Distribution of gastrointestinal tract infections by nationality during pilgrimage to Makkah (Hajj), Mina area, Makkah City, Saudi Arabia, 1418 (Hijra) - 1998 (Gregorian).

seen about mid-day time (Figure 5). Among all Hajjees, skin diseases were mostly reported among Arabs other than GCC, especially on the 10th of Dhul Hijja.

Discussion. The workload at the PHCCs varied. Of all PHCCs, those, which were located close to the Al-Jamarat area, were the busiest. A similar observation was noted by another survey conducted in 1992, although the workload at the other PHCCs in that year did not agree completely with our study. This disagreement could be due to changes in the areas designated for Hajjees from different nationalities. The study clearly demonstrated a need to expand the primary health care services at certain areas in Mina. Some nationalities utilized PHCC services in Mina more than others. This could be attributed to the relatively large numbers of Hajjees from these nationalities such as those from Southeast Asia. Unfortunately, lack of data needed for denominators made it difficult to calculate useful rates on utilization of PHCCs during Hajj. Moreover, throughout the camping days at Mina, our results consistently showed that there were 2 periods when the PHCCs were quite busy except on the morning of the 10th of Dhul Hijja, when Hajjees are involved in throwing Al-Jamarat (Jamarat Al-Aqaba), and Hajjees in the afternoon of the 12th of Dhul Hijja, when Hajjees are busy packing their luggage and getting ready for departure. These peak hours were quite noticeable, and were not distorted by rounding off the time of presentation of the Hajjee to the PHCCs made by the attending PHCC clerks. The variations in the workload at the PHCCs could help decision-makers redistribute the health manpower between and within PHCCs thereby designing a more efficient schedule for GPs and other medical staff within PHCCs.

This study showed the male/female sex ratio of PHCC users was 2:1. This shows a discrepancy from the male/female sex ratio of Hajjees reported in other studies; males were reported to be outnumbered 4 or 5 times by females in the studies that described the sex composition of Hajjees. Even though, females utilize one third of the PHCC services. Thus, the rate of utilization of PHCC services by females was twice as much as that of the males. The peak age stratum among males presenting to the PHCCs was 24-44 years while that of females was 45-65. Females were not only on average older than males, but also the proportion of females aged 65 years or older was significantly higher than male Hajjees. It is conceivable that young male Hajjees accompany their mothers to perform Hajj. The increased utilization rate of females to PHCC services in Mina could be explained by the remarkably wearisome physical effort that a Hajjee would undergo when he or she is performing Hajj duties. Females plausibly are less tolerable of such difficulties than males, especially the elderly. However, the unusual increased utilization of PHCC services by the Iranian females supports our hypothesis as almost one fifth of the Iranians were 65 years of age or older. Nevertheless, it is possible that there are some cultures or behaviors of Hajjees that induce or reduce occurrence of Hajj-associated illnesses. Similarly, the relative frequencies of diseases could help in securing the needed medication.

The movements of Hajjees on foot on the 9th of Dhul Hijja makes illnesses such as heat exhaustion and skin morbidity conditions more predominantly seen on the 10th of Dhul Hijja, whereas, gastrointestinal illnesses that require an relatively longer incubation period, are mainly seen on the 11th and the 12th of the Dhul Hijja. Occurrence of more GIT illnesses could reflect some undesirable risk behaviors among certain nationality groups such as reliance on street vendors for meals, especially at Arafat, or poor storage of leftover foods in Mina or Arafat. Acute respiratory illnesses spread in waves from one nationality group to another and by the 12th of Dhul Hijja all nationality groups were affected. The spread of ARI seemed to be related to the geographical location of the camps of Hajjees.
Hajjees from the same nationality are much more likely to mix within their camps than in other areas inside Mina. Unfortunately, the nationality-specific attack rates could not be calculated because data needed for denominators could not be obtained.

The diversity of Hajjees, the limited area of Mina, the age/sex composition of the population of Hajjees, the exhausting nature of Hajj duties (that have to be completed within defined time limits) and the preparedness of the Saudi health authorities to this annual religious event, make the Hajj journey a unique health challenge. It is different from tourism or attending mass gatherings such as the Olympic games, where travelers may be exposed to crowded but entertaining conditions for a few hours. On the other hand, Hajjees share many similarities with displaced or refugee communities. Nevertheless, the differences that distinguish the Hajj from displaced or refugee communities are paramount. Accordingly, the nature and spread of illness during Hajj days are both unmatched with any other mass gatherings. The results of this survey did not differ significantly with the results of another survey that studied the pattern of Hajj-associated diseases and dispensing of drugs during the Hajj of 1412H-(1992G). However, it is worth mentioning that the investigator could not collect data from 7 PHCCs that provided medical services mainly for Hajjees predominantly from Turkey, Europe and Southeast Asia. Although registration of episodes of illnesses is designed to be complete by linking provision of the different stages of the treatment of an illness with a single form, reporting of certain illnesses may not necessarily reflect the true picture as Hajjees may differ in their utilization of the available medical services. Other limitations of the study are the exclusion of the role of private and international medical missions, which serve a sizable proportion of Hajjees, and cases that need hospitalization. The MOH form made it difficult to detect outbreaks of acute illness easily. Although the MOH tried to simplify the data collection forms, many forms were incomplete. The sex of only 2% of cases was unknown. This is a small proportion and is unlikely to have affected the general results. However, the ages of 280 patients were not recorded. This could have resulted in some bias. But, as missing data occurred at random and there was predilection of missing values to be associated with a specific nationality or a certain PHCC, we assume that the missing data is unlikely to have distorted the results of the survey.

The MOH form used at the PHCCs proved to be very useful and could critically affect the plans for provision of PHCC services for Hajjees. Therefore, it is recommended that more care should be given for training and supervision of the clerks completing this form. Due to the dynamic changes in the composition of Hajjees and diseases, it would be used to analyze the collected data after each Hajj season to detect emerging changes in the pattern of utilization of PHCC services during Hajj seasons. A special and very sensitive public health surveillance system is activated during Hajj for early detection of outbreaks.

References

19. Al-Marzoogi A, Khogail M, Al-Ergues A. Organizational

