# EMERGENCY RESPONSE OF INDIAN HAJJ MEDICAL MISSION TO HEAT ILLNESS

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## INTRODUCTION

- Heatstroke has been a major cause of concern worldwide throughout the second half of the 20th century
- Rapid urbanization, industrialization, and consequent climate change contributes to rising heatstroke.
- In the United States, extreme heat claims more lives than all other
- weather-related exposures combined .
- Heat waves in 2003 and 2015 claimed 70 000 lives in Europe and the Indian subcontinent, respectively.
- The 2001 and 2007 Intergovernmental Panel on Climate Change (IPPC) warned about increased heat-related premature mortality among vulnerable populations.

## MATERIALS AND METHODS

- A total of 88 patients affected by the heat who presented at 36 tent-clinics at different maktabs in Mina and Arafat .during the critical days of the Hajj, 2016 from the 8th to the 12th of September,2016 were included in this prospective cross sectional Study.
- Patients brought to the maktab tent-clinics were brought to central tent-clinics, one each in Mina and Arafat, established to cater to the moving assemblage during the Hajj.
- All patients presenting with effects of heat at any time of day or night were included in the study under inclusive sampling.
- Similar presentations under conditions attributable to pre-existing comorbidities were excluded.
- The emergency response plan comprised rapid cooling followed by an assessment of related risk factors
- Clinico-demographic parameters were assessed.
- Heat exhaustion and heat stroke were deduced from pale perspiring skin and flushed dry skin, respectively, along with suggestive features.

## RESULTS

| Age | Males | Females | Cumulative percentage | 95% confidence interval |
|---|---|---|---|---|
| 31-40 years | 1 | 3 | 4.5 | 1.7-11.1 |
| 41-50 years | 3 | 11 | 15.9 | 9.7-24.9 |
| 51-60 | 16 | 14 | 34.1 | 25-44.5 |
| 61-70 | 31 | 4 | 39.8 | 30.2-50.2 |
| >70 | 4 | 1 | 5.6 | 2.4-12.6 |
| **Pre-existing comorbidity** | | | | |
| Diabetes mellitus (DM) | 18 | 13 | 35.2 | 26.1-45.6 |
| Hypertension | 13 | 9 | 25 | 17.1-34.9 |
| Other cardiovascular disease | 1 | 3 | 4.5 | 1.7-11.1 |
| Respiratory disease | 1 | 1 | 2.3 | 0.6-7.9 |
| DM + Hypertension | 24 | 5 | 32.9 | 24-43.3 |
| Mental health disorders | 2 | 0 | 2.3 | 0.6-7.9 |
| Individuals on medications | 37 | 22 | 67.1 | 56.7-75.9 |
| **Heat Illness** | | | | |
| Heat Hyperpyrexia/syncope | 28 | 20 | 54.5 | 44.2-64.5 |
| Heat Exhaustion | 24 | 11 | 39.8 | 30.2-50.2 |
| Heat Stroke | 5 | 0 | 5.7 | 2.4-12.6 |

| | No. of patients | Percentage | 95% Confidence Interval |
|---|---|---|---|
| **Etiology** | | | |
| History of outdoor exposure in shade | 12 | 13.6 | 7.9-22.3 |
| History of sun exposure | 76 | 86.4 | 77.7-92 |
| History of physical exertion while exposed | 79 | 89.8 | 81.7-94.5 |
| Duration of exposure 1-2 hours | 10 | 11.4 | 6.3-19.7 |
| Duration of exposure 2-3 hours | 41 | 46.6 | 36.5-56.9 |
| Duration of exposure 3-4 hours | 37 | 42.1 | 32.3-52.5 |
| **Symptoms** | | | |
| Headache | 12 | 13.6 | 7.9-22.3 |
| Weakness/Fatigue/Lethargy | 45 | 51.1 | 40.9-61.3 |
| Thirst | 15 | 17.1 | 10.6-26.2 |
| Dizziness | 32 | 36.4 | 28.1-46.8 |
| Nausea | 34 | 38.6 | 29.2-49.1 |
| Vomiting | 2 | 2.3 | 0.6-7.9 |
| Cramps (Abdomen/extremities) | 15 | 17.1 | 10.6-26.2 |
| Oedema | 2 | 2.3 | 0.6-7.9 |
| Breathlessness | 16 | 18.2 | 11.5-27.5 |
| **Signs** | | | |
| Confusion | 12 | 13.6 | 7.9-22.3 |
| Restlessness/Agitation/Irritability | 34 | 38.6 | 29.2-49.1 |
| Delirium | 18 | 20.5 | 13.3-30 |
| Pale perspiring skin (Exhaustion) | 47 | 53.4 | 43.1-63.5 |
| Flushed dry skin (Stroke) | 11 | 12.5 | 7.1-21.1 |
| Rash | Nil | - | - |
| Hot to touch | 59 | 67.1 | 56.7-75.9 |
| Strong bounding pulse | 21 | 23.9 | 16.2-33.7 |
| Rapid weak pulse | 32 | 36.4 | 28.1-46.8 |
| Tachypnoea | 34 | 38.6 | 29.2-49.1 |
| Hypertension | 59 | 67.1 | 56.7-75.9 |
| Hypotension | 15 | 17.1 | 10.6-26.2 |
| Syncope/Unconsciousness/Coma | 4 | 4.5 | 1.7-11.1 |
| Haematuria | 2 | 2.3 | 0.6-7.9 |
| Loss of bowel and bladder control | 4 | 4.5 | 1.7-11.1 |
| Death | 2 | 2.3 | 0.6-7.9 |
| Hypoglycemia | 24/42 | 57.1 | 42.2-70.9 |

## DISCUSSION AND CONCLUSION

- Mass gatherings evoke a high incidence of environment specific medical challenges
- Major contributors to overall heat stress are mean temperatures reaching 45°C, humidity approaching 80%, and stagnant atmospheric conditions
- The heat index climbs to 90°C or more.
- A core body temperature above 41°C may be lethal; however, recovery has been reported even at 46°C
- The overwhelming incidence of heat illness among Indian pilgrims in the critical 5-day period of the Hajj represents the tip of the iceberg, as the Hajj attracts over 3.5 million pilgrims from 200 countries annually.
- Heat illness is difficult to manage in the presence of comorbidities.
- Heat illness mandates a greater emphasis on Hajj health preparedness in times of ongoing climate change.
- Technological advancements such as healthcare robots and drones can facilitate rapid relief, the provision of medical supplies, and can minimize human resource deployment in future Hajj pilgrimages

## REFERENCES

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