

## Conference Paper

# Cause of Death of Indonesia Hajj in Armenia, Saudi Arabia 2015

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## Abstract

This study aimed to describe a cause of death among Indonesian Hajj Pilgrims in Armenia at hajj implementation 2015. This research conducted an observational study. The subjects were 213 of Indonesian hajj pilgrims who died in Armenia in Hajj pilgrims 2015. Data were processed from secondary data and analyzed quantitatively. The cause of death Indonesian Hajj was Respiratory Disease were 130 cases (61%), circulation 54 cases (25%) and symptoms, signs and abnormal clinical 23 cases (11%). Hajj pilgrims in 2015 undertook at summer. The temperature at the field Arafah was around 52 degrees Celsius. At Mina, the temperature which was between 47-48 degrees, crowdedness at Mina to Jamarat, and long distance route to Jamarat for Indonesian hajj which was around 2-7.5 KM resulted in some health problems including; unusual physical tiredness and exhaustion (physical stress). This condition became more serious for Hajj pilgrims with high risks disease. The high risk of Indonesian Hajj wasas much as 92,609 (60.90%) from 167,609 pilgrims. Physical activities and mobility that exceeded health condition, lack of nutrition supply and dehydration became the cause of the death. The death of Indonesian pilgrims 2015 in Armenia was three times higher than the previous year. On Hajj Implementation 2015 stampede occurred on Thursday, September 24th 2015 in Mina at the intersection of streets 204 and 223 leading up to Jamaraat Bridge. Pilgrims died from that incident were 1,470, 125 of them were from Indonesia.

**Keywords:** Cause of death; hot sun exposure; physical stress; stampede

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## 1. Introduction

Every follower of Islam is required to visit Mecca during the Hajj at least once in his or her lifetime (Pane et al. 2013). The pilgrimage is one of the Five Pillars of Islam. During the month of the Hajj, Mecca must cope with as many as three million pilgrims. Various ethnic groups of more than 140 countries worldwide come for this ritual. The rituals performed during include a walk around Kaaba, a cube-shaped building in Makkah considered the most sacred site in Islam, followed by the Sa'i consisting of walking between two hills (Safa and Marwa) seven times, each with a distance of about 450 m to a total of 3.15 km. Other rites include a 14.5 km journey to the desert Arafat, a night spent at

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Muzdalifah where pebbles to be thrown the following day at Mina (about 5 km from Makkah). Pilgrims activities on ARMINA (Arafah, Muzdalifah, and Mina). On Arafah day, all pilgrims must assemble on the Mount of Mercy from morning until sunset. After sunset, a mass exodus of pilgrims starts from Arafat, mainly on foot, towards Muzdalifah, an open plain, where pilgrims spend a night under the open sky. In the morning they head towards Mina, where they spend three days in camps one rite are performed during this period, stoning the devil and Each day the pilgrim throws 21 pebbles at three stone monuments which symbolize the devil (Pane et al. 2013). This event is a unique mass migration, which is in a state of the extraordinary density of people in various locations with extreme environmental conditions that occur in the same period (Hajj's Season). It attributed the epidemiological determinants of health as a risk factor or risk behavior, which may result in morbidity and mortality caused by infectious diseases and non-communicable diseases (Djaffar 2013).

Indonesia as the largest Muslim population in the world. Each year provides the largest single source of pilgrims for the Hajj (10%). Moreover, the majority of pilgrims are over 50 years of age. In this age group, chronic diseases such as diabetes mellitus, cardiovascular diseases, and chronic respiratory diseases are also prevalent — the high-Risk Indonesian Hajj 2015 as much as 60.90 %, high risk due to underlying health conditions or their ages. To identify them, Ministry of Health Republic of Indonesia give them high risk bracelet with different color: red color for Indonesia Hajj age over 60 years old with chronic disease is 32.27%; yellow color for Indonesia Hajj age less than 60 years old with chronic disease 57.78%; and green color Indonesia hajj age over 60 years without chronic Disease (Kemenkes RI 2015a). This health status of Jemaah Haji could be detected in a health screening in embarrass before departure to the Holy Land (Saudi Arabia).

Since 1950 Indonesian authorities have provided medical services to Hajj pilgrims, such as pre-departure health screening and vaccination as well as temporary medical clinics staffed by Indonesian doctors in Saudi Arabia were introduced. Health Hajj Indonesia programs which have been implemented by the Government with various efforts to improve from year to year, but still found the health problems that affect the high morbidity and mortality of Jamaah. In the last ten years, the death rate reached 2.1 to 3.2 per 1.000, nearly 70 % incidence of deaths in the age group 60 years and over (Kemenkes RI 2013).

The Crude Death Rate (CDR) of Jamaah 2011 showed that variables; age  $\geq 60$  was higher than age  $< 60$  in 2011 (5.0 0/00: 2.0 0/00). Makkah Node (Simple Makkah) 2011 was higher than Madinah Node 2011 (1.84 0/00: 0.32 0/00; Post-Armina Period (Period Pasca-Armina 2011) was higher than those in Pre-Armina Period 2011 with (1.660/00:

0.60 0/00); and Second Wave (Gelombang Kedua) 2011 was higher than First Wave 2011 (3.050/00: 2.340/00) (Kodim 2013).

The percentage Pilgrims died in 2006 - 2007, namely: Gender Male 56.8 % (2006) and 65.7 % (2007), and  $\geq 60$  year age group 70.3 % (2006) and 73.6 % (2007), respectively. So it can be concluded tendency that more male Jamaah death at the age group of  $> 60$  years (Achmadi 2010).

Factors that contribute to mortality of Indonesian hajj pilgrims are age, sex, educational level, length of stay and pre-existing diseases. The factors with the highest contributions to mortality were age 60–69 years (36.4%), age  $>79$  years (30.0%), male (27.6%) and low education (29.0%). Pre-existing disease contributed  $<6\%$  to the death rate. Adjusted real per capita expenditure, no access to health facilities adult literacy, populations with health problems and populations self-medicating contributed to mortality of Indonesian hajj pilgrims after controlling for other variables (Pane et al. 2013).

## 2. Methods

### 2.1. Research design

Observational research was conducted with a cross-sectional study or time point approach. This study used quantitative data in the form of secondary data based on the data from SISKOHATKES (computerized hajj health information system) consisting of Indonesia Hajj who died, having a chronological time and place of death, medical diagnosis based on the provisions of the International Classification of Diseases-10th Revision (ICD-X), and the time of occurrence of death in the period of Armenia and located at the Armina 2015.

### 2.2. Populations and samples

Populations and samples in this study were 213 Indonesia pilgrims who died in a period in Armenia on September 22<sup>nd</sup> 2015 to September 26<sup>th</sup>.

### 2.3. Data collective

Quantitative data of Jemaah Haji Indonesia who died in Armenia by 2015 obtained from the Siskohatkes Hajj Health Centre of the Ministry of the health of the Republic of Indonesia (*Puskeshaji-Kemenkes*). Data collection was conducted on November 2<sup>nd</sup> 2015 to April 15<sup>th</sup> 2016, by accessing [siskohatkes.depkes.go.id](http://siskohatkes.depkes.go.id). The data have been

obtained further processed and analyzed in the formulation of the problem and appropriate research purposes. Qualitative observations were by done in September 21<sup>st</sup> – 26<sup>th</sup> 2015 at Mina.

### 3. Results

The results of research on Indonesia pilgrims who died in the period Armenia by 2015 by as much as 213 (0.137%) of the total of Indonesian Hajj as much as 167,609 pilgrims. The death of Indonesian Hajj by 2015 as many as 630 people higher compared to the previous year were 296 pilgrims (Kemenkes RI 2015b). At the end of Indonesian pilgrims 2015 in Armenia, there were 213 people, three times higher than the same period (Kemenkes RI 2015c).

TABLE 1: Distribution of Death Indonesian Hajj by Sex in the Armina in 2015 Period.

Sex	n	Percentage
Male	93	43.7 %
Female	110	56.3 %
Total	213	100 %

Based on the table above the number of female Indonesia Hajj who died during the period of Armenia as much as 110 people (56.3%) higher than male Indonesian hajj.

TABLE 2: Distribution of death Indonesia Hajj By Ages Group in the Armina in 2015 Period.

Variables	Age <= 60 years	Age > 60 years
Male	43 (35.5%)	50 (54.4%)
Female	78 (64.5%)	42 (45.6%)
Total	121 (100%)	92(100%)

Based on the table 2, the number of Female Indonesia Hajj age group <=60 years old who died during the period of Armenia as much as 78 people (64.5%) higher than male Indonesian hajj.

TABLE 3: The distribution of Deaths according to Indonesia Hajj by Site at Armina 2015.

Period	n	%
Arofah	32	15%
Muzdalifah	1	0.5%
Mina	180	84.5%
Total	213	100%

Based on the mortality table 3, there were 180 Indonesia pilgrims (84.5%), in the Arofah, there were 32 (15%) pilgrims and Muzdalifah, there was 1 (0.5% pilgrim)

TABLE 4: Distribution of causes of death of Indonesian Hajj in the period Arminia 2015.

Causes of Death	Amount	%
Circulation Disease	54	25 %
Respiratory Disease	130	61 %
Symptoms, signs and abnormal clinical	23	11 %
Other symptoms	6	3 %
Total	213	100 %

Based on the table above causes the death of Jemaah Haji mostly was Respiratory Disease as many as 130 cases (61%).

## 4. Discussions

This study described the cause of death Indonesian hajj at Armina Saudi Arabia in 2015. Some Indonesian Hajj with high risk were 95,210 pilgrims (60.5%) from total Indonesian hajj were 167,609 pilgrims considered high risk due to underlying health conditions or their age. Mortality rates were found to be greatest in females with aged  $\leq 60$  years; most deaths attributed to and respiratory diseases, cardiovascular diseases and symptoms, sign and abnormal clinical. The site of death at Mina were 180 Cases, Arofah 32 Cases, and Muzdalifah 1 case.

Observation results Implementation hajj 2015 on summer obtained the highest temperature in the period Armina. At Arofah field temperature ranges from 52 degrees Celsius while the pilgrims only shelter with tents made of fabric. This condition could worsen for high-risk of elderly group. In Mina, air temperature ranges from 46-47 degrees Celsius with a very high activity level throwing pebbles with a 3 Km – 7 Km. All activities of Hajj can see that all the rites of the Hajj entail strenuous physical effort. However, if the physical exertion is increased beyond its natural limits, in hot weather, the pilgrims may suffer from various heat-induced illnesses. Particularly true for those with chronic diseases. Exposure to hot sun exposure may result in a variety of heat illnesses—heat cramps, heat exhaustion, and heat stroke. Heat stroke is the least common but the most serious for the elderly. Excess mortality from cardiovascular diseases and it is possible that such deaths are heat induced. Excessively hot weather may also increase mortality from hypertensive heart disease in these period Overcrowding as another significant problem since the area is limited with increasing accommodation annually. Lack of sleep and the resulting physical exhaustion both influence to heat illnesses.

During heat stress, high demands are made on the cardiovascular system to divert blood from the central organs to the periphery to augment heat loss and sweating (Pane et al. 2013). On the first mina day while of pilgrims had to stone Jumrah Aqobah

while the temperature was about 47 degrees Celsius. A stampede occurred Thursday 24 September 2015 at 09:00 Mecca time (06:00 UTC). The incident happened at the intersection of streets 204 and 223 leading up to Jamaraat Bridge which resulted in a tight and stationary human traffic, which made it very difficult for pilgrims even standing. Pilgrims, in efforts to get fresh air, very few succeeded, while most pilgrims were death because of compressed asphyxia (Khogali 1983). Pilgrims died from that incident 1,470 which resulted in more deaths among the 125 Indonesian pilgrims (Kemenkes RI 2015c).

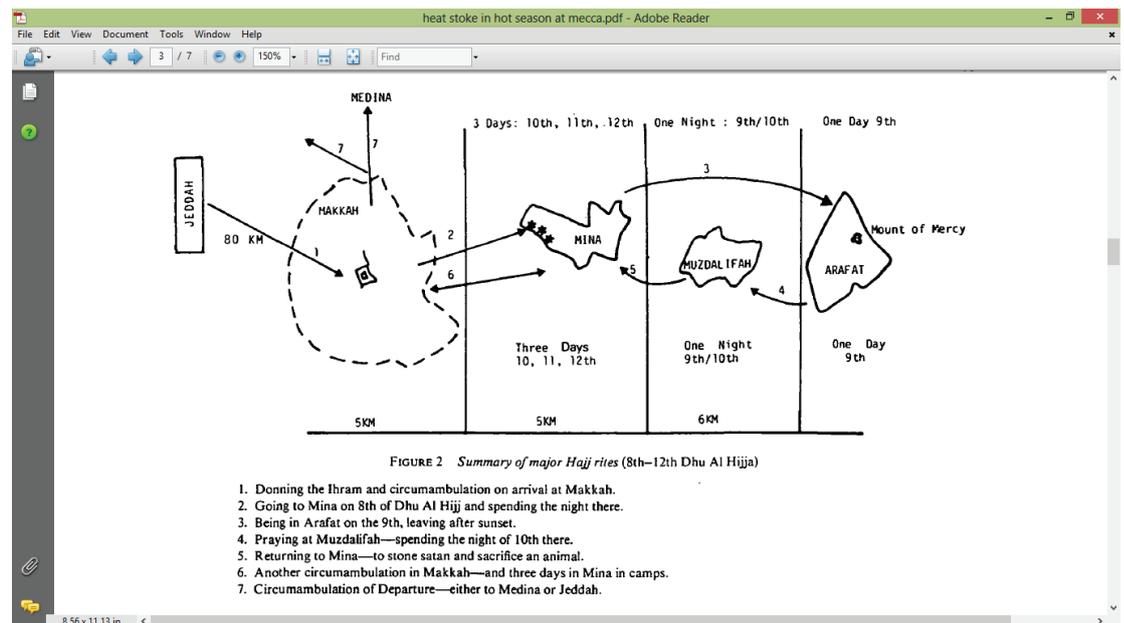


Figure 1: Summary of Major Hajj Rites (8<sup>th</sup>-12<sup>th</sup> Dzulhijjah).

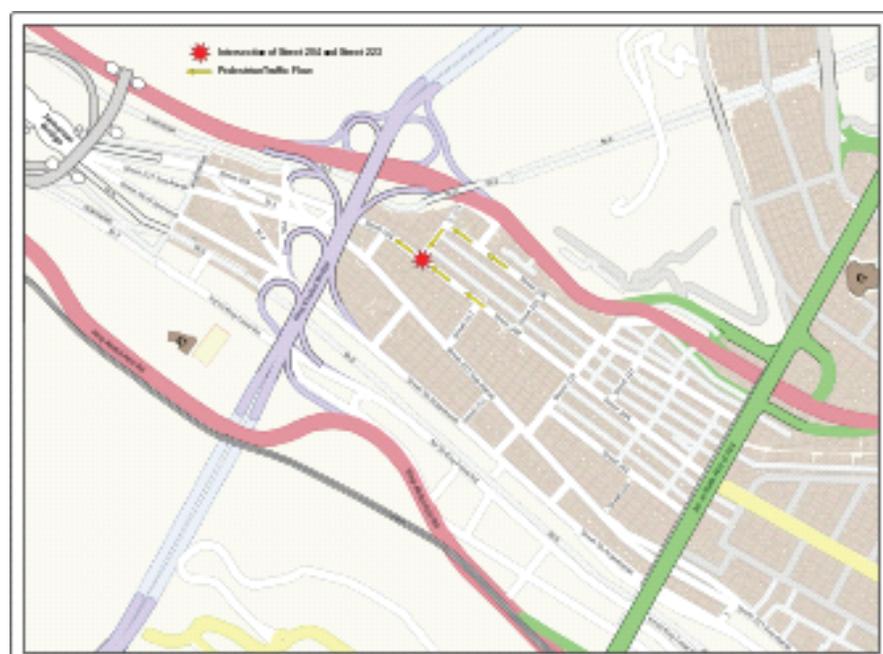


Figure 2: Location stampede 2015 intersection 204 and 223 Mina (Source: Wikipedia 2015).

The anticipation of efforts undertaken PPIH Saudi Arabia by 2015 was the health promotion for Indonesian pilgrim were advised to bring enough water with them all the time they leave the housing to conduct the rituals, so that could prevent them from being dehydrated caused by the heat. And the PPIH providing sufficient amounts of mineral water that is as much as 10 Bottles each day for all Indonesian pilgrim. But at the time the final sweeping of the tent of the pilgrims still found plenty of water that accumulate it caused pilgrims don't want to drink plenty water for because they do not want the line to the bathroom. Also, PPIH Saudi Arabia also conducts various Education to the Indonesia Hajj in order not to carry out activities that are not important and comply with the rules by throwing the jamarat appropriate time allowed. PPIH Saudi Arabia at Mina did anticipation effort by setting up, health team earlier on 8th of Dhul-Hijjah to provide health services and Education to the Jemaah Haji who did Tarwiyah (came to Mina early on the 8<sup>th</sup> of Dhul-Hijjah, then go to Arofah in the early morning and on the 9th of Dhul-Hijjah night) back to Mina. Prepare a TETA (evacuation of Personnel without tools) are ready to evacuate the synagogue of the Hajj in Mina without tools that do not allow the presence of other vehicles or ambulance runs.

## 5. Conclusions

High Risk with underlying disease of the Indonesia Hajj causes of the high mortality in Armina 2015. Exposure of temperatures and exacerbate the condition, and stampede caution Indonesia Hajj who died at Armina Period 3 times higher than the previous year. Some Indonesia Hajj woman who died as many as 110 pilgrims (51.6%) higher than male. Some Indonesia Hajj who died at Mina age group (under or equal to 60 years) as many as 121 people (56.3%). Physical exhaustion and dehydration Increase the number of dead Indonesian Hajj. Inadequate health promotion for Indonesia Hajj before departure to Saudi Arabia can be led to a lack of anticipate by Indonesian Haji to dealing with the condition in Saudi Arabia. Prompted by difficulties in identifying bodies after the Mina disaster, require all Indonesia Hajj to wear an electronic bracelet (*radio frequency identification* (RFID) containing identity information and health status of Indonesia hajj from the first Examination by *Puskesmas* throw current examination in Saudi Arabia.

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