

Risk factors analysis of Haji pilgrimage embarking from Indonesia in 2007

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Introduction

I have been working in Port Health Office (PHO) Medan of North Sumatera Province, Indonesia since 1 December 2002. Port Health Office is a central government organization which functions to prevent the spreading of diseases through port areas including: seaport, airport and land crossing. The tasks of PHO are: to prevent quarantine diseases, prevent outbreak potential disease, quarantine; port limited health services and environment risk control, maintain epidemiology networking on international, national and regional level, facilitate and advocacy on health in emergency including hajj (Moslem pilgrimage to Mecca) health, facilitate and advocacy on occupational health and safety in port areas and ground crossing, conduct vessel sanitation examination, information system management and health networking in port areas and land crossing.

As part of the PHO officer my professional tasks were: managing the vector control activities, ensuring environmental sanitation is executed according to the standard, and supervision of management information system.

Since 2004, I worked as operator of Siskohatkes (computerized hajj health information system) in Port Health Post (PHP) Medan during the annual pilgrimage period. I have attended some short training on epidemiology, where as in August 1 2007, I was appointed as an epidemiologist.

The main objective of this study is to analyze the risk factors of hajj pilgrimage of the pilgrims that embarking from Indonesia in 2007. The study will describe the preventive and curative intervention provided before and during the hajj pilgrimage.

Why it is a public health problem?

Hajj pilgrimage is an annual occasion for Moslem to conduct certain rituals in certain time in Mecca, Saudi Arabia. A big number of Moslems from all over the world will perform the hajj pilgrim in the holy city of Mecca. Conducting the hajj pilgrimage is an obligation for a Moslem who could afford to do so financially and also health condition wise.

Overcrowding during the 1-2 months-long religious rituals of hajj pilgrimage may facilitate the occurrence of certain diseases or even cause death including transmission of contagious diseases,; especially among those who have certain high risk factors, such as elderly, and/or people that have (had) diseases such as stroke, high blood pressure, and respiratory diseases. Because of hajj pilgrimage are expensive, often those who can afford to go already old, which increase their risk to contact disease during their pilgrimage.

The health problem during the hajj pilgrimage is quite substantial. In respond to this, it is crucial to provide better health services. The government takes it as a responsibility to provide good care for the pilgrims; therefore it is important to know the specific risk in order to prevent the illnesses and mortality during the pilgrimage.

This thesis is addressed to the Ministry of Health of Republic Indonesia to propose some recommendation regarding the hajj pilgrimage health. I hope that the finding/results of this paper can be used as a reference to the Ministry of Health of Indonesia on its efforts to better improve hajj pilgrimage health services.

Chapter 1: Background

1.1. Background information of Indonesia

1.1.1. Demographic and Health Situation

Indonesia is a nation situated in South East Asia, comprising of 17,508 islands stretched from the island of Sumatra in the Indian Ocean in the West till the island of Irian in the East. The country shares land borders with Malaysia in the North, Papua New Guinea in the East, and Timor Leste in the Southeast. Other neighboring countries include Singapore, Brunei Darussalam and the Philippines in the north, Australia in the Southeast, and the Indian territory of the Andaman and Nicobar islands. It has an area of 1,919,440 km². The nation's capital city is Jakarta, located in Java Island. The country has 33 provinces, including 2 specific areas and one capital, 349 districts and 91 municipalities/cities, which are divided into 5,656 sub-districts, 7,123 hamlets and 71,563 villages (BPS, 2007).

Indonesia is the fourth biggest country in the world according to the number of population, after China, India and United States of America (GeoHive, 2008). Based on the Inter Census Population Survey 2005 (BPS, 2007), Indonesia has a population of 218,868,791, with a sex ratio male/female of 1.01, and population density level 118 per square km. High density level is still dominated by provinces in Java; DKI (Daerah Khusus Ibukota) Jakarta is the highest with density level 13,499 per square km, followed by West Java with density level 1,146 per square km, and Banten with density level 1,066 per square km. And the lowest density level is Papua with 8 per square km.

According to the number of Islamic population in 2006, Indonesia, although officially not an Islamic-state, has 195.272 millions Moslems inhabitant which made the country as the largest Moslem population in the world (88 % of total population in the country), followed by Pakistan with 157.528 millions Moslems population (97 % of total population in the country), India with 154.504 millions Moslems population (13.4 % of total population in the country), and Bangladesh with 127.3286 millions Moslems population (88.3 % of total population in the country) (Islamic Population, 2008).

Health Status

Based on Indonesian Population Projection (IPP) 2000-2025, Infant Mortality Rate (IMR) decreased significantly from 52 per 1000 live birth in 1997 to 28 per 1000 live birth in 2005. DKI Jakarta has the lowest IMR with 14 per 1000 live birth, and West Nusa Tenggara has the highest with 51 per 1000 live birth.

According to Indonesia Demographic and Health Survey (IDHS) in 2002-2003, Under 5 Mortality Rate (UMR) was 46 per 1000 live birth. Based on

World Health Report (2008), life expectancy at birth for male and female in Indonesia in 2006 were 66 and 69 years, respectively. Maternal Mortality Ratio (MMR) for the year 2005 was 420 per 100,000 live births.

Adult mortality rate (probability of dying between 15 to 60 years per 1000 population) is 231 per 1000 male population and 192 per 1000 female population, and for both sexes are 212 per 1000 population.

Health System

In Indonesia, there is at least one Primary Health Centre (PHC/Puskesmas) in each sub-district, usually supported by two or three sub-PHC (Puskesmas Pembantu=Pustu) in village level. Primary Health Centre mainly provides basic health services. Most of the health centers are equipped with four-wheel drive vehicles (ambulance) to serve as mobile health centers (Puskesmas Keliling=Pusling) and provide services to under-served populations in urban and remote rural areas.

At the village level, the integrated Health Post (Posyandu) provides preventive and promotive services. These health posts are established and managed by the community with the assistance of PHC staff. Village midwives clinics (Pondok bersalin Desa = Polindes) were build to improve maternal and child health, therefore midwives are being deployed to the villages.

In 2000, with the implementation of Law No. 22/1999 regarding Regional Governance and Law No. 25/1999 regarding the financial equality between Central and Regional government, the Decentralization Policy has been implemented in Indonesia. Therefore nowadays there are three levels of regional autonomy: Province, District, and City regional autonomy.

The Law stated that there is no hierarchical links between these three regional autonomy administrations. However, in the explanation it is stated that Governor will have to perform links in guidance, monitoring and supervision to the District and City areas. This in relation to the delegation of responsibility to Province which has been stated as having limited autonomy; but it has been also given broader de-concentration as representative of Central government. The rule of Guidance and Supervision has been clearly stated in the Government Law No. 20/2001 regarding Guidance and Supervision of Governance implementation applied to local government.

In line with Province government responsibility, Broader Decentralization has been given to District and City levels. Regional government has also been given the authority of "support" or "medebewind". This has an implication that regional development has to be performed by District/City, while the

development at Province level is limited only to those, which have not been covered by District/City, and Inter-district/Inter-city. Meanwhile, the Central government has to perform the role of policy formulation, standards and providing guidance to Province and District/City government levels.

Government Law on Health No. 23/1992 has stated that Health Systems should be implemented by the community with government as facilitator. Private sectors will perform an active role, so that government will act in the provision of guidance and supervision.

Health Financing

Health financing is mostly through out-of-pocket (OOP) spending at the time they receive the service. The Public Health Insurance (Jaminan Pemeliharaan Kesehatan Masyarakat = JPKM) use co-payment mechanism between the community who use the health services, government and health providers. Based on Law No. 20/2004 about National Social Security System, JPKM changed to be The Health Insurance for the Poor (Asuransi Kesehatan untuk masyarakat miskin = Askeskin). This type of Health Insurance aimed to give a free health services for the poor. Based on Regulation released by the Ministry of Health of Republic Indonesia No. 125/Menkes/SK/II/2008 regarding Rules and Regulation on Health Insurance for the Poor, Askeskin renamed to be Public Health Insurance (Jaminan Kesehatan Masyarakat = Jamkesmas).

According to the WHO Report 2008, the health expenditure ratios in Indonesia for the year 2005: total expenditure on health as % of gross domestic product was 2.1, general government expenditure on health as % of total expenditure on health was 46.6, private expenditure on health as % of total expenditure on health was 53.4, general government expenditure on health as % of total government expenditure was 5.1, and external resources for health as % of total expenditure on health was 4.6.

The health expenditure for Indonesia in 2005: social security expenditure on health as % of general government expenditure on health was 20.7, out-of-pocket expenditure as % of private expenditure on health was 66.4, and private prepaid plans as % of private expenditure on health was 9.7.

As the health expenditure per capita for Indonesia in 2005: per capita total expenditure on health at average exchange rate (US\$) was 26, per capita total expenditure on health (PPP int. \$) 78, per capita government expenditure on health at average exchange rate (US\$) was 12, and per capita government expenditure on health (PPP int. \$) was 36.

1.1.2. Indonesian Pilgrims situation

For the total population of Moslems, Indonesia got a quota of 205,185 for the hajj pilgrimage in the year 2007/2008. This quota has been divided over the 12 embarkation airports and over 487 groups of flights (Siskohatkes, 2007).

Hajj, the Moslem pilgrimage to Mecca, is the largest annual gathering of its kind in the world. All adult Muslims who are physically and financially able to do so have a religious obligation to make the pilgrimage once in their lifetime. Each year, over two million Moslems from around the world gather in Mecca. Around 205,185 pilgrims (also known as Hajjees) from Indonesia attended the 2007/2008 Hajj season. The Hajj takes place between the eighth and thirteenth day of the last month of the Islamic lunar calendar, and therefore falls at different dates each year. The last Hajj took place between 17 and 22 December 2007. But the pilgrims from Indonesia stayed in Saudi Arabia (Mecca, Madina, and Jiddah) from 17 November 2007 until 22 January 2008; depending on the flight they joined (Siskohatkes, 2008)

Overcrowding during the 1-2 months-long of the religious rituals may facilitate the occurrence of certain diseases or even cause death; especially among those who have certain high risk factors, such as elderly, and/or people that have (had) diseases such as stroke, high blood pressure, and respiratory diseases.

The risk factors of each of the hajj individuals are written in the health book, the information are based on three medical examinations: 1) at the Primary Health Centre (about four months before departure), 2) the extended medical examination in the District Hospital which also includes meningitis vaccination (about 1-2 month before departure), 3) medical examination at the Embarkation health post or hajj barrack just one day before departure. Health book is a pilgrim's medical record that included the pilgrim's past disease, pilgrim's family health history, pilgrim's risk factors and present health condition.

1.2. Problem Statement

Based on data from the Siskohatkes which is based on data of pilgrim's registration at the Ministry of Religious Affairs of Republic Indonesia, there are the following numbers of pilgrims from Indonesia in 2007: 17-49 years old 103,909 persons (50.64 %), 50-59 years old 55,614 persons (27.10%), 60-69 years old 33,871 persons (16.5%) and over 70 years old 11,791 persons (5.75%). This means that 22.25% of the pilgrims are elderly (60 years and older).

The same source shows that 112,176 out of 205,185 pilgrims were females (54.67%), who might be considered as a more vulnerable group, regarding the overcrowding and the physical exhaustion during the pilgrimage. For 197,137 persons (96%) out of 205,185 pilgrims, their pilgrimage is the first pilgrimage, this might be due to restriction for pilgrims from Indonesia according to regulation released by Ministry of Religious Affairs No. 15/2006 regarding Hajj Registration (MoRARI, 2006). In the regulation it is mentioned that those who already went on pilgrimage and will not accompany any family members will be put on the waiting list, so that priority will be given to those who have never done the pilgrimage.

The concentration of so many people from different parts of the world with different characteristics in unavoidably overcrowded conditions within a confined area for a defined period of time presents many public health challenges and subsequently, health risks are greatly increased, with brought up potential threat and consequences both to local and international public health situation. The Saudi authorities take these challenges very seriously and continually review arrangements to improve the pilgrims' infrastructure environment, such as the modification of construction of pillars in Mina by increasing the width of the Al-Kubra stoning area, changing positions of the exit barriers (al-Kubra area) and pillar locations (ground floor) (see annex 5).

The physical exhaustion, overcrowding and high prevalence of pre-existing health conditions or pre-travel diagnosis such as diabetes, heart disease, chronic chest conditions, renal and liver disease favor the spread of communicable diseases, including meningococcal infections, influenza, tuberculosis and gastrointestinal infections. Non-communicable health risks associated with the Hajj are mainly related to physical and heat exhaustion, heat stroke and physical injuries. The risks may be minimized by offering pre-travel advice and appropriate immunizations. Practical advice should be offered for pilgrims by the health authorities in their home countries, and this is now available in Indonesia.

Out of the 205,185 pilgrims registered, 195,805 pilgrims (95.43%) departed to Saudi Arabia, of whom 34,201 pilgrims (17.47%) were found to have a high risk status based on health examination conducted in Primary Health Care, District Hospital and Embarkation Health Post (Siskohatkes, 2008).

The number of registered pilgrims obtained from Ministry of Religious Affairs of Republic Indonesia. This number is the quota for the maximum numbers for Indonesian pilgrims that can go to Saudi Arabia to conduct the pilgrimage. So that Ministry of Religious Affairs of Republic Indonesia limits the number of the population who wanted to be registered as pilgrim

according to that number. The number of departed pilgrims obtained from Ministry of Health of Republic Indonesia. This number is the number of pilgrims that departed to Saudi Arabia to conduct the pilgrimage.

There is difference between registered and departed number. This difference due to a long process from being registered until really departed. Some of them might be too old or too ill, so that they could not make it to the pilgrimage. Some of them died before departed. Some of them could not go regarding their family or working condition.

The pilgrims who have high risk status are those who need more medical attention during the pilgrimage process. In this situation if the pilgrims with high risk status are not being taken care of properly, the situation might lead to their death.

Even though many pilgrims are not in fit condition when they conducted the pilgrimage, but the pilgrimage is important for them, as it is one of the religion obligations. Actually, the obligation just given for those whom could afford the pilgrimage in term of expenses and health. But, many of them believe that to die in Mecca is a destiny in life, and they would be very grateful if they do so. And many of them believe that they might get recovered from their illnesses if they could make the pilgrimage. Many other believe that all their sins in their life would be forgiven if they could make the pilgrimage. Hence, they would still insist to conduct the pilgrimage even though they are not fit to travel and perform the exhausted hajj pilgrimage rituals.

The health problem during the hajj pilgrimage is quite substantial, so it will need a better health services. The government takes it as a responsibility to provide good care for the pilgrims; therefore it is important to know the specific risk in order to prevent the illnesses and death during the pilgrimage. The Ministry of Health of Republic Indonesia provide health services before and during the pilgrimage including: medical examinations in Primary Health Centers, District Hospitals and Port Health Posts; health services in Saudi Arabia during the pilgrimage: Flight Group Health Teams, Indonesian Pilgrims Sector-Clinics, and Indonesian Pilgrims Clinics; and after the pilgrimage: health services provided in debarkation Port Health Post.

1.2.1. Study Questions

1. Is there any relation between high risk factors like age, gender and pre-travel diagnosis (and any other factors which influence these risk factors) and the death of the hajj pilgrimage from Indonesia ?

2. How can the preparation of the hajj pilgrimage of the people embarking from Indonesia be improved ?

1.2.2. Objective and specific objectives

1. Objective

To describe and analyse the pre-existing diseases, and health care for pilgrims who are going for the hajj in order to provide better quality of health care of the hajj pilgrimage before and during the pilgrimage.

2. Specific Objectives

- a) To describe the preventive and curative interventions provided to the Indonesian pilgrims.
- b) To describe most frequent diseases and health problems that occur in Saudi Arabia during the pilgrimage.
- c) To describe the risk factors for illness and death during the Hajj period of the people embarking from Indonesia.
- d) To analyse death rate during the hajj pilgrimage for different age groups and describe the causes of death and compare the death rate among pilgrims with the national rate.
- e) To analyse relative risk of death for high risk pilgrims compared to low risk pilgrims.
- f) To give recommendation to the pilgrims regarding personal health, pilgrimage organizations and the government about the hajj pilgrim's health, and how to improve health care before and during the hajj pilgrimage.

Chapter 2: Methodology and Study Limitations

2.1. Methodology

The study design is a review study in Indonesia and Saudi Arabia. Data were collected by literature review. Data were compiled through journals, reports, published and unpublished documents concerning the Indonesian Hajj Pilgrimage Health. Basic and main data obtained from Siskohatkes database (Siskohatkes = computerized hajj health information system). Other data obtained from KIT library, international online data base (such as PubMed, Google), and national/international organizations (Ministry of Health of Republic Indonesia, Ministry of Religious Affairs, National Statistics Board, World Health Organization).

Search strategy: Internet search and KIT library.

Search engine: public health sites, Pubmed and Google as the main searching engine.

Keywords: pilgrimage, pilgrimage death, pilgrims, hajj, hajj health, risk factors, combined with Indonesia.

This study will analyze the Indonesian Hajj Pilgrimage Health, before the pilgrimage and during the pilgrimage in Saudi Arabia.

The framework used in the analysis of the preventive and curative interventions for Indonesian pilgrims' health will use the conceptual framework of Poverty Reduction Strategy Papers (PRSP) model, since this model is used to study utilization and effective coverage. Potential coverage is influenced by accessibility, availability of human and material, organizational quality, and social accountability. Actual coverage is influenced by utilization (initial contact), timing and continuity, and technical quality.

1. Accessibility and Affordability

Physical and financial access to preventive and curative intervention services; Primary Health Centers, District Hospitals, Port Health Post, Flight Group Health Teams, Indonesian Pilgrims Sector Clinics, Clinics and Hospitals in Saudi Arabia.

2. Availability of Human and Material

Health workers, drugs and equipments.

3. Organizational/service quality

Training, supervision, staff incentives and opening hours.

4. Social accountability

Civil society representation, involvement of pilgrims and communities in planning and management of the preventive and curative intervention for the pilgrimage.

5. Utilization (initial contact)

Medical examination in Primary Health Centers and District Hospitals; health services provided by Flight Group Health Teams and in Sub-Clinics and Clinics.

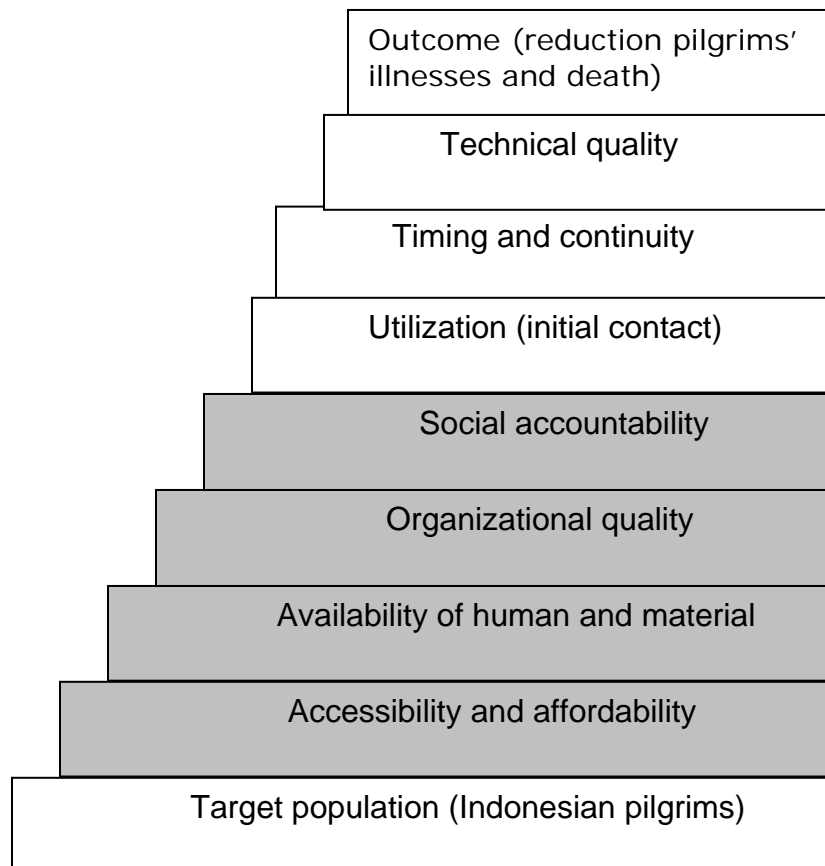
6. Timing and continuity

Adequacy of medical record in pilgrims' health books, reporting the health services used during and after the pilgrimage.

7. Technical quality

Well-defined protocols; availability of drug and equipment, and competent health care providers.

Figure 1. PRSP Model



Beside the PRSP model, other issues such as pilgrims quote and age limitation, communities' belief regarding the death during pilgrimage are also discussed because these issues are important determinant of successful preventive and curative intervention for Indonesian Hajj Pilgrims Health implementation.

2.2. Study Limitations

2.2.1 Limitation of literature review

The data used regarding the most frequent diseases occurred in Saudi Arabia during the pilgrimage are secondary data. Secondary data is data that collected by other studies and then employed to do the study of Indonesian Hajj Pilgrimage Health. If those other studies do not have similar characteristics with the Indonesian Hajj Pilgrimage Health, the analysis which can be done is limited and may be subjected to many adjustments.

The literatures used are mainly studies conducted regarding the hajj pilgrimage by international researcher/writers, and only limited studies available regarding the Indonesian Hajj Pilgrimage Health. This could limit the validity as the Indonesian pilgrims might have specific problems and practices.

2.2.2. Limited data

Basic and main data obtained from Health Siskohat database (Siskohat = computerized hajj system information), and through communication with the person in charge of those data from Sub-Directorate Hajj Health, Directorate General of Disease Control and Environment Health Ministry of Health of Republic Indonesia. So that, in some analysis the denominators used is the total number of registered pilgrims or assumption departed number. There are some limitations regarding the availability data:

- Data for total number of registered pilgrims obtained from Ministry of Religious Affair of Republic Indonesia. This data including the number of each age group, total number of each gender, and total number of ever conducted the hajj pilgrimage, but not by gender in each group.
- Data for total number of departed pilgrims from each embarking cities obtained from Ministry of Health of Republic Indonesia. This data including the schedule of departing to Saudi Arabia and arrival in Indonesia, but no data regarding number of pilgrims in each age group and gender.
- Data for total number of high risk pilgrims and died pilgrims in Saudi Arabia obtained from Siskohatkes database.
- No data available regarding why some of the pilgrims that registered did not depart to Saudi Arabia to conduct the pilgrimage.
- No detail data available regarding healthy pilgrims (those that did not die) and illnesses occurred during the pilgrimage.

Other limited data regarding the death mortality rate in Indonesia, is that no age specific death rate.

Chapter 3: Study Results/finding

3.1. Description of the Hajj Rituals

The rituals and duties performed by a pilgrim during the hajj period take place at various locations in and around Mecca. The rituals are complex and vary slightly according to different Islamic traditions. "Many of the rituals are physically strenuous" (Shafi, 2006).

The things that should be performed along the hajj period are:

1. *Tawaaf*: circumambulation around the Kaba seven time on foot in an anti clockwise direction which will end in Hijr Al-Aswad (the black stone), where most likely all the pilgrims would like to touch or kiss the stone. Kaba is the central point towards which Moslems face when performing prayers from anywhere in the world, and Hijr Al-Aswad is a meteorite believed to have been sent from heaven. According to Shariati (1990) as cited by Abdurrahman (2000), tawaaf is symbolic of the unity of God and man, man and man, and heaven and earth.
2. *Sa'iee*: involves rapidly walking (running) between two hillocks (Safa and Marwa) which is approximately 500 m apart. Sa'iee is a ritual to commemorate a search for water by Hagar, wife of the Prophet Ibrahim, for her and her son Ismael, who started to cry for water and hit the ground with his feet, upon which the water of the Zamzam started coming up from under his feet. As part of the rituals, traditionally, the pilgrims drink zamzam water before and after the rituals.
3. *Wukuf*: staying from dawn to dusk at the Plain of Arafaat, where they stand in contemplative vigil, near a hill from which Muhammad gave his last sermon. This is considered the highlight of the Hajj. Pilgrims must spend the afternoon within a defined area on the plain of Arafaat until after sunset. No specific rituals or prayers are required during the stay at Arafaat, although many pilgrims spend time praying, and thinking about the course of their lives. If a pilgrim does not spend the afternoon on Arafaat then their pilgrimage is considered invalid.
4. *Mabit*: overnight outdoor camping in Muzdalifah where 49 pebbles (small rounded stones) are collected for the stoning ritual. Many pilgrims spend the night sleeping on the ground at Muzdalifah before returning to Mina, and many other just collected the stones and spend the night on the buses until morning and then return to Mina.
5. *Jamarat* (throwing at Satan): the symbolic stoning of the devils, by throwing the pebbles at three white pillars in Mina. This symbolizes the trials experienced by Abraham while he decided whether to sacrifice his son as demanded by God. The Devil challenged him six times, and three times Abraham refused. Each pillar marks the location of one of these refusals. Each pilgrim must hit each pillar with a stone at least seven times.

6. *Eid- Al Adha* (the feast of sacrifice): After the stoning of the devil an animal (a sheep or other cattle) is sacrificed. This symbolizes God having mercy on Abraham and replacing his son with a ram (male sheep), which Abraham then sacrificed. Traditionally the pilgrims slaughtered the animal themselves, or oversaw the slaughtering.
7. *Tawaaf az-ziyara* or *Tawaaf al-Ifadah* which symbolizes being in a hurry to respond to God and show love for Him, an obligatory part of the Hajj.
8. *Tawaaf al-Wada*: a farewell tawaaf before leaving Mecca.

Each ritual must be completed at or within a prescribed time, and doing so in large crowds is physically demanding. It is important for each pilgrim to be fit and healthy to perform all the rituals in order to achieve the spiritual goals of the Hajj. The majority of pilgrims also visit other historical places around Mecca and Medina, such as the Prophet's Mosque which contains the Prophet's catacomb in Medina, climb the *Jabal Ar-Rahma* (the Mountain of Mercy), which is believed to be the place where Adam and Eve were exiled from heaven, and where Prophet Muhammad last preached before his death.

Indonesians pilgrims who stayed 8-10 days in Medina most likely to conduct the Arbain, praying 5 times a day in the Prophet's Mosque, during 8 days stay in Medina.

3.2. Preventive and curative intervention provided to the Indonesian pilgrims in 2007

3.2.1. Preventive and curative intervention provided to the Indonesian pilgrims before the pilgrimage in 2007

1. Medical Examination I in Primary Health Centre (PHC)

The first medical examination of the pilgrims is conducted in a nearby PHC approximately 4 months before departure. At the PHC issues to be examined are: (a) risk factors, including pre-existing disease of the pilgrims and the pilgrims family, (b) present condition, (c) basic laboratorium test, including pregnancy test for female at child bearing age. The risk factor(s) and diagnose(s) are coded according to the ICD-X. The result of the medical examination are: healthy, need to refer to District Hospital for further examination based on the result(s) from PHC, or postponed (e.g. when the pregnancy test result is positive the pilgrimage has to be postponed to the following year).

2. Medical Examination II in District Hospital (DH)

The second medical examination for all the pilgrims is conducted in the DH, approximately 2 months before departure. At the DH issues to be examined are: (a) risk factors, including pre-existing disease of the pilgrims and the

pilgrims family (from the first medical examination), (b) present condition, (c) mental health, and (d) laboratorium test, including radiology, cardiology and pregnancy test for the female at child bearing age. The result of this medical examination are: healthy, high risk groups (not fit to travel), and postponed/delayed (e.g. in case the pilgrim is too ill to go on pilgrimage or the pregnancy test result is positive). A meningitis vaccination is given to the pilgrims if the result of medical examination are healthy or belong to high risk group.

3. Medical Examination III in Embarkation Port Health Post (PHP)

The last medical examination for the pilgrims is conducted in the Embarkation Port Health Post just one day prior to departure. At the Embarkation PHP the following to be examined are: (a) present condition, and (b) laboratorium test, including pregnancy test for the female at child bearing age. healthy, high risk groups (not fit to travel), and postponed/delayed (e.g. in case the pilgrim is too ill to go on pilgrimage or the pregnancy test result is positive).

Those who were too ill and needed hospitalization were referred to the Hajj Hospital (HH) or another hospital which was pointed out as referral hospital for Pilgrims health. Those who tested positive as being pregnant were also referred to the HH or another referral hospital for Pilgrims health to confirm the pregnancy.

Pregnant women are not allowed to go to Mecca because they could not be vaccinated against meningococcal disease due to the pregnancy, meanwhile vaccination against meningococcal disease is an obligation to obtain visa from Arab Saudi.

3.2.2. Preventive and curative intervention provided to the Indonesian pilgrims during the pilgrimage in 2007

Basically, the pilgrims from Indonesia will be divided into 2 session flight groups, the first session flight groups after arrival in Jiddah and Medina will go directly to Medina and stay there for 8-10 days before finally moving to Mecca where they will stay there for 3-4 weeks, to conduct the ritual of hajj. They will fly back home from Mecca through Jiddah and Medina.

The second session flight groups, after arrival in Jiddah and Medina, will go directly to Mecca and stay there for 3-4 weeks and conduct the ritual of hajj. After the hajj session, these pilgrims will go to Medina and stay there for 8-10 days, and they will fly back home from Medina through Jiddah and Medina.

All pilgrims will stay 1-2 days in Jiddah waiting for their flight back home.

Preventive and curative interventions are provided to the Indonesian hajj pilgrims during the pilgrimage as follow:

1. Flight Groups Health Team (FGHT)

One medical doctor and two paramedics accompany the pilgrims in each flight group. They provide basic health services for the pilgrims of their own flight, started on the flight, in Saudi Arabia, until coming back to Indonesia. FGHT are provided with basic drugs and equipments. In Saudi Arabia, when the patients can not be handled by their FGHT, they will refer the patients to the Sector Clinics for further treatment.

2. Indonesian Pilgrims Sector Clinics (IPSC)

There are 5 sector clinics in Medina and 15 sector clinics in Mecca. Each sector clinic serves a number of flight groups. In Sector Clinics, there are 3 doctors, of whom at least one is specialist, internist and/or pulmonologist, 5 paramedics, 1 sanitarian/surveillance officer and 1 pharmacy officer. The sector clinics provide comprehensive health care, drugs and equipment. When the patients can not be handled by the sector clinics health team, they will be referred to clinics for further treatment and/or hospitalization.

3. Indonesian Pilgrims Clinics (IPC)

There are 3 clinics, 1 in Jiddah, 1 in Medina and 1 clinic in Mecca. Each clinic serves a number of flight groups that stay in the city. In Jiddah, there are 5 doctors (two pulmonologists, 1 cardiologist and 2 GP's), 6 paramedics, 2 sanitarian/surveillance officer and 2 pharmacy officers. In Mecca, there are 11 doctors (two pulmonologists, 4 cardiologists, 3 specialists in internal medicine and 2 GP's), 40 paramedics, 1 laboratorium officer, 5 sanitarian/surveillance officers and 4 pharmacy officers. In Medina, there are 7 doctors (two cardiologist, 1 specialist in internal medicine, 1 pulmonologist and 3 GP's), 12 paramedics, 1 laboratorium officer, 3 sanitarian/surveillance officers and 3 pharmacy officers.

These clinics again provide more comprehensive health care, drugs and equipment. When patients can not be handled by the clinics health team, they will refer the patients to the Saudi Arabia hospitals for further treatment and/or hospitalization.

4. Saudi Arabia Hospitals (SAH)

The referral hospitals in Saudi Arabia for Indonesian pilgrims are: AL-Noor Specialized Hospital, Al-Heera Hospital, Al-Zaher Hospital and Syisah Hospital in Mecca, and, King Abdulaziz Hospital and King Fahd Hospital in Medina.

5. Medical Examination at the Debarkation Port Health Post

Upon arrival in the airport of debarkation, pilgrims who are ill and or have high risk factors will be brought directly to the Debarkation Port Health Post

for medical examination. If they could not be taken care of, they would be referred to the Hajj Hospital or any other hospital pointed out as referral hospital for Pilgrims health for further treatment.

All other pilgrims gathered in the hajj barrack have to wait for the administration procedure to be finished. At the moment of waiting, all pilgrims will be observed whether they have any health problems. If pilgrims do not have any health problems, they will be given an "Alert Card" to be used as reference for health service providers in case they get any health problems within 14 days of arrival home.

3.2.3. The PRSP Model Approach for preventive and curative interventions before and during the pilgrimage

1. Accessibility and affordability

In Indonesia, every sub-district has at least one PHC, so that for the first medical examination, the pilgrims may not need to go far to reach the facility. For the second medical examination that conducted in District Hospital, pilgrims may have to travel quite far due to geographical condition. For the last medical examination in Port Health Post, all pilgrims should be there prior to departure.

The Flight Group Health Teams are health workers that taking care of the pilgrims' health from their own flight group. Indonesian Pilgrims Sector Clinics and Clinics are located in the surrounding of the pilgrims housing. The health services provided for the pilgrims are free of charge, so that the health services are affordable for the pilgrims.

2. Availability of Human and Material

The Government of Republic Indonesia provided health workers, drugs and equipments for each health services providers regarding the hajj health, started from Primary Health Centers, District Hospitals, Port Health Posts, Flight Group Health Teams, Indonesian Pilgrims Sector Clinics until Indonesian Clinics in Saudi Arabia.

3. Organizational/service quality

Medical examination conducted in a certain time only in Primary Health Centers, District Hospitals and Port Health Posts. While during the pilgrimage, pilgrims could see the Flight Group Health Teams and or visit the Indonesian Pilgrims Sector Clinics and Clinics 24 hours a day, all days during week. Even the FGHT visited the pilgrims housing regularly.

Health workers that involve in hajj health are given training prior to medical examination or prior to departure to Saudi Arabia. The training given was regarding medical examination and ICD-X code.

Yet, not all health services providers have good report system, therefore not all the pilgrims health books filled with ICD-X codes (if indicated so), and not all health services providers, especially those in Saudi Arabia (IPSC and IPC), reported regularly the number of pilgrims who use the services.

There were no specific selection processes for health workers that conducted medical examinations in PHC, DH and PHP. The health workers were just being appointed by local authorities to conduct the medical examinations. But for FGHT, and other health workers in IPSC and Clinics, there were highly selective selections based on some certain criteria and working experience. Basically, priority would be given to doctors and paramedics that worked in emergency unit, and or having certificates of Advanced Cardiac Life Support (ACLS) for doctors or Basic Cardiac Life Support (BCLS) for paramedics.

Health workers that involved in hajj health also being supervised, they need to report their activities based on the job descriptions given, and after the pilgrimage done they will get incentives. The health workers that provided health services in FGHT and in Saudi Arabia also get honors to work as health workers on hajj pilgrimage.

4. Social accountability

Planning and management of the preventive and curative intervention for Indonesian pilgrims before and during the pilgrimage is solely the task of Ministry of Health of Republic Indonesia. There is no NGO or community representative involved regarding the planning and management of the preventive and curative intervention, but the process evaluated together with the parliament (DPR).

5. Utilization (initial contact)

The pilgrims obliged to take the medical examination in PHC, DH and PHP, and they may use the health services provided by FGHT and in IPSC and Clinics if they need them.

6. Timing and continuity

There is inadequate medical record reported in pilgrims' health books. If all medical examination's result in PHC, District Hospitals and Port Health Posts recorded well in the health books, it would make the FGHT and other health care providers in Saudi Arabia easy to give proper medication for the pilgrims. Unfortunately, not all health books were filled in completely. Also, the reporting systems for utilization of health services during the pilgrimage were not regular.

7. Technical quality

Ministry of Health of Republic Indonesia has already developed guidelines for medical examination in PHC, District Hospital, Port Health Post, Indonesian Pilgrims Sector Clinics, and Indonesian Pilgrims Clinics. The health workers involved in hajj pilgrimage health are given training prior to medical examination and departure to Arab Saudi. The government also provided drugs and equipments needed before and during the pilgrimage.

3.3. Diseases and health problems that most frequently occur in Saudi Arabia during the pilgrimage

3.3.1. Communicable Diseases during the hajj period

The most serious communicable disease risks and measures taken to prevent them by the Saudi Arabian authorities and also by the Indonesian government are described below.

1. Meningococcal infections

Based on a study by Lingappa et al. (2003), an outbreak of serogroup W-135 meningococcal disease had occurred during the 2000 Hajj in Saudi Arabia. The disease was reported worldwide in Hajj pilgrims and their close contacts; however, most cases were identified in Saudi Arabia.

Until the 1987 Hajj, vaccination against meningococcal disease groups A and C was mandatory for pilgrims from sub-Saharan countries. However, an outbreak of *Neisseria meningitides* serogroup A infection in 1987 highlighted the potential for international spread of infection during pilgrimage, and A&C meningococcal vaccination was made mandatory for all pilgrims applying for visas for Saudi Arabia (WHO, 1988). Hajj visas cannot be issued without proof of vaccination.

Introduction of the quadrivalent ACWY vaccine together with a high profile awareness campaign by ministries of health worldwide and the outbreak was quickly brought to an end. The quadrivalent vaccine is now a mandatory requirement before obtaining a visa to enter Saudi Arabia (Zuckerman, 2002) and is valid for three years. Continued vigilance and a sustained campaign are essential to prevent further outbreaks of this serious infection. All pilgrims from Indonesia are being vaccinated against meningococcal disease, approximately 2 months before departure to Saudi Arabia (MoHRI, 2002).

In relation to the validity of meningitis vaccination, it is possible for a pregnant female pilgrim to go on the pilgrimage as long as she had gotten the vaccination against meningococcal disease within 3 years (MoHRI, 1995).

2. Influenza

According to WHO (2007), the most frequently reported complaints among pilgrims are upper respiratory symptoms. Influenza vaccination has been reported to reduce influenza-like illness among pilgrims and should be highly recommended vaccination for all those making the Hajj. Influenza is a highly contagious infection, and it is important to increase awareness and uptake of influenza vaccine among pilgrims at high risk of serious illness regarding their age (over 65 years) or pre-travel diagnosis.

Recent studies have shown a high incidence of influenza infections during the Hajj (Balkhy, 2004) and so it would seem prudent to regard all Hajj pilgrims at risk to have vaccination against influenza. So that, the Saudi Ministry of Health recommends that pilgrims are vaccinated against influenza before travel, particularly those at greater risk. But this is not a national obligatory in Indonesia; the Ministry of Health of Republic Indonesia just gives recommendation regarding this vaccination, as this vaccination is not a free of charge service.

3. Polio

Saudi Arabia was declared to be a polio-free in 1995, but after polio cases were reported in countries including Yemen and Indonesia during 2005 (WHO, 2007), there is now heightened vigilance and determination to keep Saudi Arabia polio-free, and to prevent the possibility of spreading the infection between pilgrims during the Hajj. Since 2005, the Ministry of Health of Saudi Arabia requires that children under 15 years of age traveling to Saudi Arabia from countries where wild poliovirus has been reported must be vaccinated against polio before entry into the country, whether or not they are visiting for the Hajj. Based on Ministry of Religious Affairs of Republic Indonesia Regulation No.15/2006, regarding Indonesian Hajj Pilgrims Registration, only people of minimum 17 years old are eligible to register as pilgrims in Indonesia. So, the Indonesian pilgrims are not compulsory to be immunized against polio.

4. Cholera and other diarrheal and gastrointestinal disease

According to WHO (2007), cholera has caused Hajj-related outbreaks in the past but not since the last documented outbreak of cholera in 1989, among Malaysian pilgrims. This outbreak of diarrheal disease and food poisoning during the Hajj was due to crowded conditions and the difficulty of maintaining good hygiene. After the last outbreak the Saudi Arabian authority improved the water supply and sewage systems with the improvement in sanitation and water delivery to the Hajj sites since the mid-1990s.

To avoid future outbreaks, the Saudi Ministry of Health has intensified surveillance of pilgrims coming from cholera endemic countries, such as Iraq, Sudan, Angola, West Africa, Niger, Senegal, Afghanistan, Nigeria,

Chad, Cameroon, Mozambique, and Zambia based on the latest WHO reports (WHO, 2008). All suspected cases will be quarantined at ports of entry, and their contacts will be followed up. No pilgrim is allowed to bring food items into the country.

This quarantine seems irrational as most of diarrheal cases are asymptomatic, while symptomatic cases would not travel anyhow due to very ill condition.

5. Blood-borne infections

After conducting Wukuf, one of the rituals of the Hajj which for the men they have shave their head and for women to cut their hair a little bit. Most men will have their heads shaved, often in an open self employed barbers that available near the Plain of Arafat. A razor blade is commonly used, and it may be used on several scalps before being ultimately discarded (Gatrad, 2005). To reduce the risk of blood borne infections such as hepatitis B and hepatitis C from the head shaving procedure, the Saudi authorities provide licensed barbers who use a new blade for each pilgrim. Pilgrims should be made aware of this facility and encouraged to use it. I got information from some pilgrims that not all of them used the licensed barbers; they often shave their head by themselves or use the assistance of the self employed barbers.

3.3.2. Non-Communicable Diseases during the hajj period

1. Cardiovascular diseases

According to Ahmed (2006), cardiovascular disease is the most common cause (43%) of death during the Hajj. Many patients have cardiac arrests, outside hospitals, at Hajj sites. Although health-care response workers are an ambulance-supported emergency medical service teams, pilgrims can rarely be resuscitated. To revive patients from massive crowds is difficult, which also can pose danger to others.

Hajj ritual is difficult to conduct even for healthy adults—for those with pre-existing cardiac diseases; the physical stress can easily precipitate ischemia. Cardiac patients planning for the Hajj should consult with their doctors before the journey; ensure sufficient supply of, and compliance with, medications. They should avoid crowds; perform some rituals by proxy, and report to the closest health centre for any symptom indicating cardiac decompensation. Avoiding the crowds is not easy to be done, because some certain rites should be conducted in a certain time where other pilgrims also doing so.

2. Problems of sun and heat

Heat exhaustion and heatstroke are common and can be fatal. One study reported more than 1700 fatalities in a single Hajj season, most of which

were judged to be heat related. The Saudi authorities, in their role as the pilgrims' hosts, undertake valuable health promotional work, distributing leaflets and issuing radio and television warnings of the dangers of excessive sun exposure. The number of people who still die of heat is evidence that the message needs to be reiterated at every possible opportunity (Gatrad, 2005). Heatstroke and severe dehydration are more frequent when the Hajj season falls during the summer months.

Pilgrims 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.

For the hajj 2007, it was conducted during the winter months, so that the pilgrims were advised to take their warm clothing and sufficient water when they conduct the hajj rituals.

3. Injuries

During the pilgrimage, minor injuries are relatively common, particularly to the toes; due to oversight being stamped on while circumambulating the Ka'ba barefoot. More serious injuries, some of which prove to be fatal, occur each year during stampedes in Mina as pilgrims undertake the stoning ritual. Pilgrims should be advised to avoid peak times, and old and infirm people should be advised to consider appointing other people (a guide, relatives or friend) for the performance of this ritual. Major trauma and death from road traffic crashes is a further important cause of injury in pilgrims (Gatrad, 2005).

Based on data obtained from Times online, USA Today and Map of the world, there were some accident occurred during the pilgrimage. In July 2, 1990, as much as 1,426 pilgrims, many of them Malaysians, Indonesians and Pakistanis, were trampled or asphyxiated to death during a stampede in overcrowded pedestrian tunnel in Mina. In May 23, 1994, 270 pilgrims, most of them Indonesian, killed in stampede, in 1998, 388 pilgrims were killed in two separate stampedes, and in 2004, 251 pilgrims were killed during the stoning ritual at Mina. And the last accident was on Thursday January 12, 2006, where around 400 pilgrims died and about a thousand other were injured in a stampede on the last day of the pilgrimage 2006.

According to Uddin and Ozair, some of main caused of the stampede are pilgrims carrying baggage while going for stoning because they wanted to go to Mecca directly after stoning, pilgrims entering or leaving Jamarat bridge in reverse directions, because of their housing located in different side of Jamarat. So that, in case of some pilgrims pushing others pilgrims on either side with their elbows, it would be easily cause the stampede.

4. Fire-related injury

In April 15, 1997, fire devastated the Mina area driven by high winds tear through a sprawling, overcrowded tent city at Mina. There were 343 deaths and more than 1500 estimated casualties (Times online, USA Today and Map of the world). Since then all temporary tents have been replaced by permanent fiberglass installations. At Hajj time, Teflon-coated awnings are added, and the aluminum frames remain in place the rest of the year. No pilgrim is permitted to set up his own tent. Additionally, pilgrims are not allowed to cook food at Mina. Smoking is forbidden during the Hajj by Islamic teaching, thus reducing the risk of a naked flame. Continuous public education is being undertaken to further reduce fire risk (Ahmed, 2006).

5. Occupational hazards of slaughter

Slaughterers at the Hajj are exposed to unique traumatic risks. Over a million cattle are slaughtered each Hajj period, up to half a million before noon on the 10th day of the Hajj. In one study, 298 emergency visits for hand injury were treated in Mecca over four Hajj seasons. More than 80% were injuries from animal slaughter; many avoidable injuries were suffered by common people and who are not trained to slaughter. Pilgrims need to be assured that professional slaughtering arrangements are easily available at the Hajj, and far safer (Ahmed, 2006).

6. Other health condition

Beside the communicable and non-communicable diseases that most frequent occurred during the pilgrimage, other health condition that might become health problems during the pilgrimage is menstruation. Menstruation is considered a state of uncleanness to perform any ritual, including performing the Hajj rituals. In other words, menstruation women are free from obligation to conduct the Islamic rituals. This often causes a great deal of concern, which is perfectly understandable if one remembers the importance of the journey and the time, effort, and money that may have been invested. Delaying menstrual bleeding, by using the combined contraceptive pill or daily progesterone, for example, is perfectly acceptable.

According to regulation released by Ministry of Health and Ministry of Religious Affair of Republic of Indonesia, Decision No. 2571 Menkes/SKB/III/1995, about postponing pregnant women in pilgrimage, pregnant woman is not allowed to conduct the pilgrimage, which then postponed for the coming year. Those women in child bearing age that are not pregnant recommended to use family planning method in delaying menstrual bleeding (MoHRI, 1995).

3.4. High risk factors and any other factors which influence these risk factors of the Indonesian Pilgrims in 2007

Pilgrims are categorized as high risk group if they have any risk factor such as pre existing diseases and/or illness based on the medical examination. From the medical examination conducted in PHC, District Hospital until Port Health Post, pilgrims with high risk factors will be recognised. Some of the pilgrims showed no high risk factors based on medical examination conducted in PHC and District Hospital, but then they often show the high risk factors when the medical examination is conducted in Port Health Post. These factors were mostly related to mental disorder such as anxiety disorders, and diseases of nervous system such as tension-type headache and disorders of initiating and maintaining sleep. Other risk factors which were found after medical examination conducted in Port Health Post were hypertension and hypotension. These risk factors were written in the health book, and reported to the Flight Groups Health Team as reference and precaution about the condition of the pilgrims they accompanied. The high risk factors were also reported daily to the Siskohatkes as online report.

Due to the limited data, the total number of registered pilgrims just distinguished by age group, total number of males and females, and were not combination of age group and gender. Total number of registered pilgrims by gender are 93,009 male pilgrims and 112,176 female pilgrims. From 205,185 pilgrims registered for the Hajj 2007 of which 54.7% were female and 45.3% male, there were only 195,805 pilgrims that departed to Saudi Arabia, as shown in the table below.

Table 1. The number of the pilgrims from Indonesia registered in 2007 by age group

Age group (year)	Number	%
17 - 49	103,909	50.64
50 - 59	55,614	27.10
60 - 69	33,871	16.51
> 70	11,791	5.75
Total	205,185	100.00

Source: Ministry of Religious Affairs, 2007

The table above shows that the highest percentage of pilgrims who are registered belong to the age group of 17-49 years old (50,64%). This indicated that basically pilgrims who went to Mecca for hajj pilgrimage are people from the age group 17-49 years old followed by the age group of > 50 years old.

Tabel 2. The number of the pilgrims from Indonesia that departed in 2007 by age group and total days spent in Saudi Arabia

N	EMBARKING	NUMBER	TOTAL	TOTAL	DIED	TOTAL	TOTAL
O	CITY	OF FLT	DEPARTED	HEALTHY		DAYS	DAYS
1	BANDA ACEH	14	4,282	166,439	6	107	166,546
2	MEDAN	18	8,179	326,640	13	349	326,989
3	BATAM	23	10,055	381,025	28	744	381,769
4	PADANG	24	7,512	291,822	22	516	292,338
5	PALEMBANG	24	7,493	292,134	19	521	292,655
6	JAKARTA BK	83	37,356	1,428,578	68	1,761	1,430,339
7	JAKARTA PG	49	22,295	868,931	39	667	869,598
8	SOLO	82	33,001	1,291,166	91	2,106	1,293,272
9	SURABAYA	89	39,787	1,488,670	104	2,418	1,491,088
10	BANDJARMASIN	17	5,225	203,995	11	174	204,169
11	BALIKPAPAN	18	5,721	228,803	9	216	229,019
12	MAKASSAR	46	14,899	584,625	32	874	585,499
	TOTAL	487	195,805	7,552,828	442	10,453	7,563,281

Source: Siskohatkes, MoHRI, 2008

There was a difference in the number between registered and departed pilgrims. This could happen as the process took a relatively long time, starting from registering until realization of performing the pilgrimage. To be registered for pilgrimage in the year 2007 could have started the registration process in early 2006, followed by the next procedure which is medical examinations and other administrative procedures such as obtaining hajj passport and visa from Saudi Arabia.

The hajj passport for Indonesian pilgrim is a specific passport that issued just to conduct the pilgrimage, so it is a single used passport (disposable passport). So that in case one could afford to go to Mecca to conduct the pilgrimage every year, he or she still needs to obtain a new passport and visa.

After searching for the reason why some registered pilgrims did not depart for the Hajj, it was found that some of them were too old or too ill, hence, at the time of departing they could not make it, and some of them died before departure. Other reasons were due to pregnancy, family and working situation.

Out of 195805 pilgrims, 34,201 pilgrims (17.47%) were found to be in high risk status based on health examination conducted in Primary Health Centre, District Hospital and Embarkation Port Health Post (Siskohatkes, 2008).

The next table shows prevalence per 1000 pilgrims for the most important groups of diseases of pre-travel diagnosis.

Table 3. Number of Indonesians Pilgrims 2007 with pre-travel diagnosis by groups of diseases

ICD-X	Groups of diseases (Risk factors)	Male (total=93,009 pilgrims)		Female (total=112,176 pilgrims)		Total (total=205,185 pilgrims)	
		n	Prevalence (per 1000)	n	Prevalence (per 1000)	n	Prevalence (per 1000)
<u>A00-B99</u>	Certain infectious and parasitic diseases	106	1.14	85	0.76	191	0.93
<u>C00-D48</u>	Neoplasm	4	0.04	8	0.07	12	0.06
<u>D50-D89</u>	Blood disorders	82	0.88	253	2.26	335	1.63
<u>E00-E99</u>	Endocrines disorders	2,528	27.18	3,270	29.15	5,798	28.26
<u>F00-F99</u>	Mental disorders	6	0.06	17	0.15	23	0.11
<u>G00-G99</u>	Diseases of the nervous system	54	0.58	101	0.90	155	0.76
<u>H00-H59</u>	Diseases of the eye and adnexa	5	0.05	2	0.02	7	0.03
<u>I00-I99</u>	Circulatory system	8,228	88.46	9,045	80.63	17,273	84.18
<u>J00-J99</u>	Respiratory system	908	9.76	960	8.56	1,868	9.10
<u>K00-K93</u>	Digestive system	1,250	13.44	3,097	27.61	4,347	21.19
<u>L00-L99</u>	Diseases of the skin and subcutaneous tissue	121	1.30	206	1.84	327	1.59
<u>M00-M99</u>	Diseases of the musculoskeletal system and connective tissue	1,168	12.56	2,430	21.66	3,598	17.54
<u>N00-N99</u>	Genitourinary system	124	1.33	119	1.06	243	1.18
<u>R00-R99</u>	Symptoms not elsewhere classified	2	0.02	4	0.04	6	0.03
<u>S00-T98</u>	Injury, poisoning and certain other consequences of external causes	7	0.08	11	0.10	18	0.09
	Total	14,593	156.90	19,608	174.80	34,201	166.68

Source: Siskohatkes, MoHRI, 2007

The group of certain infectious and parasitic diseases including diarrhoea and gastroenteritis of presumed infectious origin, respiratory tuberculosis, acute Hepatitis B, plasmodium falciparum malaria, and plasmodium vivax malaria. The group of endocrines disorders included insulin dependent DM (IDDM), and non IDDM with or without peripheral circulatory complications (gangrene diabetic), and obesity.

The group of diseases of respiratory system included acute common cold, acute pharyngitis and laryngitis, influenza, viral and bacterial pneumonia, acute bronchitis, vasomotor and allergic rhinitis, other COPD, asthma, bronchiectasies, and pulmonary oedema.

The group of diseases of circulatory system included essential (primary) hypertension, acute myocardial infarction, atherosclerotic heart disease, congestive heart failure, cardiomegaly, intra-cerebral hemorrhage stroke not specified as hemorrhage, squeals of cerebra-vascular disease and hypotension (for complete pre-travel diagnosis, please refer to annex 11).

Table 4. The number of Indonesian's Pilgrims with pre-travel diagnosis by age group and gender in 2007

Age group (year)	Gender		with RF	Total registered	Prevalence (per 1000)
	Male	Female			
17 - 49	3,239	5,570	8,809	103,909	85
50 - 59	3,828	5,256	9,084	55,614	163
60 - 69	5,331	6,600	11,931	33,871	352
> 70	2,195	2,182	4,377	11,791	371
Total	14,593	19,608	34,201	205,185	167

Source: Siskohatkes, MOH, 2007

Prevalence is calculated by using the number of pilgrims that registered as denominator, rather than the number of pilgrims that actually departed. Because there is no data for division of age group of those pilgrims that departed, so the registered number used as denominator, so that the real prevalence of those departed slightly higher.

From the table above it is shown that the overall prevalence per 1000 pilgrims from Indonesia 2007 with pre-travel diagnosis is the highest 371 in the age group >70 years old, followed by age group 60-69 years old with prevalence 352 per 1000. In pilgrims with pre-travel diagnosis, there are relatively more men than woman in the age group 70 years and older.

With the assumption that departed pilgrims were 95.4% of registered pilgrims (195,805 out of 205,185), percentage of male were 45.3% and female were 54.7%, then another table is made to look further if there is any changes in prevalence of pre-travel diagnosis.

Table 5. The assumption number of Indonesian's Pilgrims with pre-travel diagnosis by age group and gender in 2007

Age group (year)	with RF	Male		Female			with RF	Total	
		assumption number	prevalence (per 1000)	With RF	assumption number	prevalence (per 1000)		assumption number	prevalence (per 1000)
17 - 49	3,239	44,919	72	5,570	54,240	103	8,809	99,159	89
50 - 59	3,828	24,041	159	5,256	29,030	181	9,084	53,072	171
60 - 69	5,331	14,642	364	6,600	17,680	373	11,931	32,323	369
> 70	2,195	5,097	431	2,182	6,155	355	4,377	11,252	389
Total	14,593	88,700	165	19,608	107,105	183	34,201	195,805	175

This table was made with assumption that the proportion of departed pilgrims were not different from registered pilgrims, in case that the young age pilgrims did not depart with the reasons of pregnancy, family and working condition, and the older age pilgrims did not depart with the reason of died before departed or too ill to conduct the pilgrimage.

From the table above, baring the assumption that the proportion of departed pilgrims were not different from registered pilgrims, it shows that prevalence of the male pilgrims from Indonesia 2007 with pre-travel diagnosis is the highest 431 per 1000 in the age group >70 years old, followed by female pilgrims in age group 60-69 years old with prevalence 373 per 1000.

If the assumptions are not true, for instance the pilgrims that did not go were all from the age group of 17-49 years, or more from the age group over 70 years, or more male that did not go than female, or the other way round, the consequences are that each group has become smaller or bigger in the pilgrimage group and then the prevalence of each group would be slightly lower or higher. But this would not change much in the difference of prevalence from each group, as there is a big difference in prevalence of pre-travel diagnosis from each group.

3.5. Analyse data of death rate (ASDR) during the hajj pilgrimage and describe the causes and main causes of the death and compare to the national rate

3.5.1. Description of death of the pilgrims

More detailed information is available for the people who died during the hajj. The total number died is 442 of which 276 male (62.4%) and 166 were female (37.6%)

The youngest and the oldest pilgrims died during the pilgrimage 2007 for female were 28 years and 92 years, respectively, meanwhile the youngest and the oldest male pilgrims died during the pilgrimage 2007 were 30 years and 88 years respectively.

The average age at death was not big difference of the two genders, with mean 64.8 year for male with CI 95% 63.7 – 66, while for female 64.4 with CI 95% 62.6 – 66.1.

Table 6. The number of Deceased pilgrims from Indonesia 2007/2008 by embarking city and gender

City of Embarking	Number of Pilgrims	Gender		Total	Death Rate (/1000)
		Male	Female		
Banda Aceh	4,282	2	4	6	1.40
Medan	8,179	5	8	13	1.59
Batam	10,055	17	11	28	2.78
Padang	7,512	11	11	22	2.93
Palembang	7,493	12	7	19	2.54
Jakarta					
Bekasi	37,356	45	23	68	1.82
Jakarta					
Pondok					
Gede	22,295	27	12	39	1.75
Solo	33,001	55	36	91	2.76
Surabaya	39,787	70	34	104	2.61
Banjarmasin	5,225	4	7	11	2.11
Balikpapan	5,721	7	2	9	1.57
Makassar	14,899	21	11	32	2.15
Total and percentage	195,805	276 (62,4%)	166 (37,6%)	442 (100%)	2.26

The table above shows that among the deceased pilgrims there were more men than women with percentage 62.4% and 37.6% respectively.

The death rate per 1000 varied from 1.4 in Banda Aceh to 2.9 in Padang.

To look further whether embarking cities is a risk factor it would be explained in the next table.

Table 7. The Odds Ratio (OR) of Deceased pilgrims from Indonesia 2007/2008 by embarking city

Embarking city	Total	Death		OR	95% CI	p-value
		Number	death rate			
Total	195,805	442	2.26			
Banda Aceh	4,282	6	1.40	1.00		
Medan	8,179	13	1.59	1.14	0.41 – 3.36	0.79
Batam	10,055	28	2.78	1.99	0.79 – 5.35	0.12
Padang	7,512	22	2.93	2.09	0.81 – 5.76	0.10
Palembang	7,493	19	2.54	1.81	0.68 – 5.06	0.20
Jakarta Bekasi	37,356	68	1.82	1.30	0.54 – 3.32	0.54
Jakarta Pondok Gede	22,295	39	1.75	1.25	0.51 – 3.28	0.61
Solo	33,001	91	2.76	1.97	0.83 – 4.99	0.10
Surabaya	39,787	104	2.61	1.87	0.79 – 4.71	0.13
Banjarmasin	5,225	11	2.11	1.50	0.52 – 4.56	0.42
Balikpapan	5,721	9	1.57	1.12	0.37 – 3.54	0.83
Makassar	14,899	32	2.15	1.53	0.61 – 4.08	0.33

Banda Aceh with the lowest death rate used as reference to calculated the Odds Ratio (OR). OR and p-values are calculated by using Epi-info statcal.exe tools and taking the Mantel-Haenszel results.

With the assumption that pilgrims from all embarking cities are having the same composition in each age group, I found no statistical difference in the death rate in each of embarking cities because all p-values were >0.05, as can be seen in table above and table 12 in the next analysis.

If composition in each age group from all embarking cities is different, then there could be bias.

Table 8. The number of Deceased pilgrims from Indonesia 2007/2008 by age group and gender

Age group (year)	Male			Female			Total		
	died	assumption Number	death rate (/1000)	died	assumption Number	death rate (/1000)	Died	pilgrims	death rate (/1000)
17 – 49	18	44,919	0.40	18	54,240	0.33	36	99,159	0.36
50 – 59	57	24,041	2.37	36	29,030	1.24	93	53,072	1.75
60 – 69	109	14,642	7.44	54	17,680	3.05	163	32,323	5.04
> 70	92	5,097	18.05	58	6,155	9.42	150	11,252	13.33
Total	276	88,700	3.11	166	107,105	1.55	442	195,805	2.26

Again, in the analysis denominators used were the total number of departed pilgrims from each age group based on assumption that departed pilgrims were 95.4% of registered pilgrims (195,805 out of 205,185), percentage of male were 45.3% and female were 54.7%. It shows that death rate of male pilgrims from Indonesia 2007/2008 in the age group > 70 years old is the highest (18.05), followed by female pilgrims in the same age group (9.42%). This is in agreement with the ICD-X in which age of 60 years old and more is categorized as high risk group (senility, code R54).

From the same table we could see that almost in all age group, male pilgrims have death rate as much as twice of female pilgrims death rate. This means that male pilgrims have a higher risk to die during the pilgrimage compare to female pilgrims.

If the assumptions are not true, for instance the pilgrims that did not go were all from the age group of 17-49 years, or more from the age group over 70 years, or more male that did not go than female, or the other way round, the consequences are that each group has become smaller or bigger in the pilgrimage group and then the death rate in each group would be slightly lower or higher. But this would not change much in the difference of death rate in each group, as there is a big difference in death rate from each group. The little change could be seen by looking at the total death rate of total pilgrims, if using the assumption departed number, the death rate is 2.26, and if using the registered number, the death rate is 2.15.

The different of death rate in each group found to be statistically significant on further analysis, see table below and table 12.

Table 9. The the Odds Ratio (OR) of Deceased pilgrims from Indonesia 2007/2008 by age group

Age Group	Death			OR	95% CI	p-value
	Total	Number	death rate			
Total	195,805	442	0.23			
17 – 49	99,159	36	0.04	1,00		
50 – 59	53,072	93	0.18	4.83	3.24 - 7.24	0.00
60 – 69	32,322	163	0.50	13.96	9.60 - 20.37	0.00
> 70	11,252	150	1.33	37.20	25.50 - 54.48	0.00

In the analysis denominators used were the assumption number of departed pilgrims. Age group of 17-49 years old with the lowest death rate used as reference to calculated the Odds Ratio (OR). OR and p-values have been calculated by using Epi-info statcal.exe tools and taking the Mantel-Haenszel results.

With p-values < 0.01, age group found to be statistically significant different. The death rate increased as one getting older, this means that age group is a risk factor to die for the pilgrims.

Table 10. The number of Deceased pilgrims from Indonesia 2007/2008 by group of disease as cause of death and by gender

Group of disease as cause of dead	Sex		Total	%
	Male	Female		
Injury and others	0	2	2	0.5
Symptoms not elsewhere specified	7	3	10	2.3
Genitourinary systems	11	3	14	3.2
Digestive systems	3	1	4	0.9
Respiratory systems	77	50	127	28.7
Circulatory systems	161	95	256	57.9
Mental disorders	1	1	2	0.5
Blood disorders	1	0	1	0.2
Neoplasms	4	5	9	2.0
Infectious and Parasitic	11	6	17	3.8
Total	276	166	442	100

The table above shows that death due to disorder in the circulatory system occurs most frequently (57.9%) followed by the respiratory system disorders group (28.7%). In the group of circulatory system disorders, cardiac arrest occurred most frequently (38%), followed by congestive heart failure (8.4%) and acute myocardial infarction (5.7%). In the group of respiratory system disorders, the most frequent diagnosis was bacterial pneumonia not elsewhere classified (21.3%), followed by other diseases of the respiratory system (3.2%) (Please refer to annex 12 for complete diagnosis of deceased pilgrims).

Cardiac arrest is the most frequent diagnosis for cause of death amongst pilgrims. The specificity of this diagnosis is needed to be verified as no detailed data regarding the process of establishment of the diagnosis

Table 11. The number of Deceased pilgrims from Indonesia 2007/2008 by city and place of dying

City location of dead	Location of dead				Total
	Housing	Clinic	SA Hospital	Other	
Mecca	111	61	130	10	312
Medina	21	6	35	7	69
Jiddah	10	0	5	10	25
Arafah	7	2	2	0	11
Mina	16	6	3	0	25
Total	165	75	175	27	442
%	37.3%	17%	39.6%	6.1%	100%

The table above shows that Saudi Arabia (SA) Hospital had the highest (39.6%) percentage of deceased pilgrims from Indonesia 2007/2008, followed by housing (37.6%). The high death rate in the SA hospital could be explained as from housing, pilgrims are referred by FGHT to the clinics, then from clinics referred to the SA Hospital, and/or in emergency referred directly to SA Hospital.

Housing also had shown a high proportion of deceased pilgrims from Indonesia, and this mostly happened in Mecca. This does not mean that before dying the pilgrims had not received any medical service, as FGHT were located in the same housing with the pilgrims. It might be explained due to sudden death and or by insufficient number of ambulances for transportation to transport the ill person from the housing to the clinic. The insufficient number of ambulance in the hajj period of 2005 was mentioned by Zainal Abidin Supi, the Officer in charge for Indonesian pilgrims health in Mecca (Suara Merdeka, 2005). He mentioned that 1 ambulance was provided for 10,000 pilgrims, so that the number was not sufficient regarding the situation there and the condition of the pilgrims. Unfortunately, no data are found regarding the number of ambulances provided at the hajj pilgrimage period of 2007.

3.5.2. Age Specific Death Rate

$$\text{ASDR} = \frac{\text{Number of Death}}{\text{No. Pilgrims} \times \text{days}} \times 10,000$$

ASDR	= age specific death rate during the pilgrimage
Number of death	= number of death in specific age group
No. Pilgrims	= number of pilgrims at specific age group (with assumption departed 95.43 % of registered Pilgrims, with 45.3 % male and 54.7% female)
Days	= mean number of days in Saudi Arabia = total number of days (included those died) divided by total number of pilgrims departed = 7,563,281 days/195,805 = 38.63 days
Rate	= per 10,000 per day
Total death rate	= $\frac{442 \times 10,000}{195,805 \times 38.63 \text{ days}}$ = 0.58 per 10,000 per day
ASDR 17-49 years old	= $\frac{36 \times 10,000}{99,159 \times 38.63 \text{ days}}$ = 0.09 per 10,000 per day

$$\begin{aligned} \text{ASDR 50– 59 years old} &= \frac{93}{53,072} \times 10,000 \\ &= 0.45 \text{ per } 10,000 \text{ per day} \end{aligned}$$

$$\begin{aligned} \text{ASDR 60– 69 years old} &= \frac{163}{32,323} \times 10,000 \\ &= 1.31 \text{ per } 10,000 \text{ per day} \end{aligned}$$

$$\begin{aligned} \text{ASDR } \geq 70 \text{ years old} &= \frac{150}{11,252} \times 10,000 \\ &= 3.45 \text{ per } 10,000 \text{ per day} \end{aligned}$$

Due to no available data regarding the national Age Specific Death Rate, and the composition of general population and the Indonesian pilgrims might not be the same, therefore the comparison between the ASDR of the pilgrims and the general population can not be made.

3.6. Analyse relative risk of death for high risk pilgrims compared to low risk pilgrims

Table 12. Risk factors related to death among Indonesia pilgrims during pilgrimage 2007

Categories	Total	Death Number	%	OR	95% CI	P- value
City of embarking						
Total	195,805	442	0.23			
Banda Aceh	4,282	6	0.14	1.00		
Medan	8,179	13	0.16	1.14	0.41 – 3.36	0.79
Batam	10,055	28	0.28	1.99	0.79 – 5.35	0.12
Padang	7,512	22	0.29	2.09	0.81 – 5.76	0.10
Palembang	7,493	19	0.25	1.81	0.68 – 5.06	0.20
Jakarta Bekasi	37,356	68	0.18	1.30	0.54 – 3.32	0.54
Jakarta Pondok Gede	22,295	39	0.17	1.25	0.51 – 3.28	0.61
Solo	33,001	91	0.28	1.97	0.83 – 4.99	0.10
Surabaya	39,787	104	0.26	1.87	0.79 – 4.71	0.13
Banjarmasin	5,225	11	0.21	1.50	0.52 – 4.56	0.42
Balikpapan	5,721	9	0.16	1.12	0.37 – 3.54	0.83
Makassar	14,899	32	0.21	1.53	0.61 – 4.08	0.33
Age group (years)						
Total	195,805	442	0.23			
17 – 49	99,159	36	0.04	1.00		
50 – 59	53,072	93	0.18	4.83	3.24 - 7.24	0.00
60 – 69	32,322	163	0.50	13.96	9.60 - 20.37	0.00
> 70	11,252	150	1.33	37.20	25.50 - 54.48	0.00
Gender						
Total	195,805	442	0.23			
Female	107,048	166	0.15	1.00		
Male	88,757	276	0.31	2.01	1.65 - 2.45	0.00
Pre-travel diagnosis						
Total	195,805	442	0.23			
Healthy	161,604	348	0.22	1,00		
Endocrines disorders	5,798	21	0.36	1.69	1.06 - 2.67	0.02
Circulatory system	17,273	55	0.32	1.48	1.10 - 1.98	0.01
Respiratory system	1,868	9	0.48	2.24	1.08 - 4.48	0.01
Digestive system	4,347	3	0.07	0.32	0.08 - 1.03	0.04
Others	4,915	6	0.12	0.57	0.23 - 1.31	0.16

OR and p-values have been calculated by using Epi-info statcal.exe tools and taking the Mantel-Haenszel results.

For digestive system and other pre-travel diagnosis, the CI 95% was not accurate, so exact limit preferred.

For the category city of embarking and pre-travel diagnosis, the total numbers of pilgrims were the pilgrims that really departed. But for the

categories of age group, and gender, the total numbers were the departed pilgrims distinguished to age group and gender with the assumption that departed pilgrims were 95.4% of registered pilgrims (195,805 out of 205,185), percentage of male were 45.3% and female were 53.7%.

For the category of embarking city, Banda Aceh was taken as reference city. All other cities of embarking have OR varied from 1.12 – 2.09 with 95% CI varied from 0.37 – 5.76 and p-values all > 0.05. This means that embarking city is not related to death during pilgrimage.

For the category age group, age group 17 – 49 years old was taken as reference. All other age groups had OR varied from 4.83 – 37.20 with 95% CI varied from 3.24 – 54.48 and p-values all < 0.01. This means that the older one has the higher the risk to die during pilgrimage.

For the category in gender, female was taken as reference gender. Male had a OR of 2.01 with 95% CI 1.65 – 2.45 and p-values all < 0.01. This mean that men have a higher risk to die during pilgrimage.

For the category in pre-travel diagnosis, healthy was taken as reference status. Endocrines disorders, circulatory system and respiratory system disorders have OR varied from 1.48 – 2.24 with 95% CI 1.10 – 4.48 and p-values all < 0.05. This mean that endocrines disorders, circulatory system and respiratory system disorders were risk factors to the death. But, digestive system and other pre-travel diagnosis were not risk factors with OR < 1.

To look further for difference of death rate amongst pilgrims with most frequent pre-travel diagnosis by gender, the next table was made.

Table 13. Decesead male and female pilgrims from Indonesia in 2007/2008 by most frequent pre-travel diagnosis

Pre-travel diagnosis	Male			Female			Total		
	total	died	death rate (/1000)	total	died	death rate (/1000)	Total	died	death rate (/1000)
Healthy	73,207	217	2.96	88,397	131	1.48	161,604	348	2.15
Endocrines disorders	2,528	15	5.93	3,270	6	1.83	5,798	21	3.62
Circulatory system	8,228	35	4.25	9,045	20	2.21	17,273	55	3.18
Respiratory system	908	6	6.61	960	3	3.13	1,868	9	4.82

This table supported the previous analysis that male pilgrims have relatively higher risk to die during the pilgrimage compared to female pilgrims.

In this table we can see that there is a very strong relative association between pre-travel diagnosis and the death. The three pre-travel diagnosis gave higher risk to die compare to healthy group.

For endocrines disorders, the relative risk (RR) is $3.62/2.15$ equal to 1.68, and attributable risk (AR) is $3.62-2.15$ equal to 1.47, and attributable fraction (AF) 87.5%. This means that if all pilgrims with pre-travel diagnosis endocrines disorders did not go to Mecca to conduct the pilgrimage, it would be likely that as much as 18 death regarding endocrines disorders (87.5% times 21) could be prevent during the pilgrimage.

For circulatory system disorders, the relative risk (RR) is $3.18/2.15$ equal to 1.48, and attributable risk (AR) is $3.18-2.15$ equal to 1.03, and attributable fraction (AF) 69.6%. This means that if all pilgrims with pre-travel diagnosis circulatory system disorders did not go to Mecca to conduct the pilgrimage, it would be likely that as much as 38 death regarding circulatory system disorders (69.6% times 55) could be prevent during the pilgrimage.

For respiratory system disorders, the relative risk (RR) is $4.82/2.15$ equal to 2.24, and attributable risk (AR) is $4.82-2.15$ equal to 2.67, and attributable fraction (AF) 119%. This means that if all pilgrims with pre-travel diagnosis respiratory system disorders did not go to Mecca to conduct the pilgrimage, it would be likely that all death regarding respiratory system disorders could be prevent during the pilgrimage.

Chapter 4: Discussion

4.1. Preventive and curative intervention provided to the Indonesian pilgrims

4.1.1. Preventive and curative intervention provided to the Indonesian pilgrims before the pilgrimage

The first medical examination took place in a near by Primary Health Centre (PHC) approximately 4 months before departure. The second medical examination was conducted in the District Hospital (DH), approximately 2 months before departure. Prior to the medical examination, doctors and paramedics that conducted the medical examination had been given training regarding the hajj health and the ICD-X codes.

Based on my personal experience in dealing with the hajj health in the Port Health Post (PHP), not all the pilgrims with pre-travel diagnosis had the ICD-X codes in their health books. In certain districts the health books were filled in completely, especially of those with pre-travel diagnosis using the ICD-X codes, while in other districts almost none used the ICD-X codes. Old age (age of 60 years old and over) is also categorized as high risk. So, basically those pilgrims whose age was 60 years or older should be categorized as high risk and their health book should be stamped with this high risk status, even if they did not have any pre-travel diagnosis.

The aim of the high risk status stamps on the health book was to warn to the FGHT and other health care providers in Saudi Arabia. If someone seeks health care at one of the FGHT or at the clinics in a certain condition and she/he could not speak due to amnesia, the doctor may give her/him wrong medication with are contradicted due to side effects. If she/he would have the pre-travel diagnosis already written in her/his health book, it would help the doctor to give proper medical treatment. Hence, it is really important to have the pre-travel diagnosis recorded in the health books and have the high risks status stamped on the health book if indicated.

In those embarking cities with only one group of flight embarking per day, the last medical examination conducted in the Port Health Post, could be easier be done and more thoroughly compared to other cities where 2 or 3 groups of flights embarked each day. This means, that in case there was no high risk status stamped in the health book of the pilgrim who during this last examination appeared to have a pre-travel diagnosis, this high risk status stamp would be provided in Port Health Post (PHP). However in cities which were embarking 2 or 3 flights per day, this task could not easily be conducted due to the limited number of health workers in those Port Health Posts (PHP), which means that a pilgrim with pre-travel diagnosis would not be registered with a high risk status.

After the last medical examination has been conducted, all pilgrims with a high risk status and their pre-travel diagnosis are reported to the FGHT. This pre-travel diagnosis is also reported on the website which is accessible to all health authorities at various locations.

Due to this incomplete registration of high risk status including the pre-travel diagnosis it may be possible that “healthy” pilgrims who died in Saudi Arabia in reality had pre-travel diagnosis.

When I was still working in the Port Health Post (PHP), I once got information from the doctors who conducted the medical examination in PHC regarding the availability of health books. They said that after the medical examination they sometimes had to wait a few months to get the health books, and sometimes the health books still had to be filled in after medical examination in the District Hospital. This lack of health books could also explain –at least partly- the un-stamped high risk status of pilgrims with pre-travel diagnosis.

4.1.2. Preventive and curative intervention provided to the Indonesian pilgrims during the pilgrimage

Based on Regulation No. 511/MENKES/SK/V/2007 of the Ministry of Health of Indonesia about Indonesian Hajj Pilgrims Health Team Recruitment, for the selection of FGHT priority would be given to doctors and paramedics working in High Care Unit (HCU), having ACLS certificate for doctors, and BCLS certificate for paramedics. This regulation was released due to the need for good emergency care during the hajj period. The number of paramedics accompanying the doctors has also been improved compared to the previous hajj periods: in the previous hajj period one doctor was accompanied by one paramedics only and in 2007 one doctor was accompanied by two paramedics.

In 2007, the ratio of doctor and pilgrims was 1 doctor on 325 – 455 pilgrims, and the ratio of paramedics and pilgrims was 2 paramedics on 325-455 pilgrims. If this ratio is compared to the general population it seems high, as in general population the rate is 1 doctor on 7000 population, and 1 paramedic/nurse on 2000 population. Despite this high ratio during the pilgrimage, in certain situations the number of doctors and paramedics might be insufficient, specially during the main hajj rites, where many pilgrims really get exhausted and are in need of medical treatment.

There is also an insufficient number of health workers in Saudi Arabia, especially for the daily reporting from subclinics. Only one

sanitarian/epidemiologist from each subclinic is responsible for sanitation/epidemiology and reporting. This lack of health workers is seen on the website where they did not report daily although it was their responsibility.

4.2. Diseases and health problems that most frequently occur in Saudi Arabia during the pilgrimage

The medical treatment provided by the FGHT during the hajj pilgrimage should be reported by the FGHT in their health report books. These health report books are collected in the Port Health Post upon arrival in Indonesia. Unfortunately, no data were available regarding these health report books. Pilgrims that had medical treatment in the subclinics and clinics including those referred to the SA hospital should be reported through the website. But, since there were insufficient health workers to report, there are no complete data regarding diseases and health problems that occurred among the Indonesian pilgrims during the hajj 2007. We could not answer this study question from the data that available.

4.3. High risk factors and any other factors which influence these risk factors of the Indonesian Pilgrims in 2007

Embarking cities are not risk factors to illnesses and death of the pilgrims, as shown in table 6 and 7. This finding was not expected as at the beginning there were differences in death rate of pilgrims from different embarking cities.

From chapter 3, it is clear that age groups of 50 years old and older is influenced to some degree of the death of Indonesian pilgrims. The test results show that with increased the age there is increased chance of death significantly with p-value < 0.01.

It is clear that gender also influenced to the death of Indonesian pilgrims, where as male had a OR of 2.01 with 95% CI 1.65 – 2.45 and p-values all < 0.01. This mean that men have a higher risk to die during pilgrimage, or in other words, male would likely to die 2 times higher compared to female during the pilgrimage. This finding supported by table 9, that shown differences between male and female. From the data it is not possible to analyse whether this is caused by pre-selection of male with high risk factor or that male gender it self as a risk factor. Man that going to hajj has a higher risk to die among female that going to the hajj as well.

4.4 Analyse data of death rate (ASDR) during the hajj pilgrimage and describe the causes and main causes of the death and compare to the national rate

From chapter 3, it is clear that age specific death rate (ASDR) will increase as the age increased. The highest ASDR is in age group > 70 years old with ASDR 3.45 per 10,000 per day, which is almost 6 times of total death rate per 10,000 per day.

Due to no available data regarding the national Age Specific Death Rate, and the composition of general population and the Indonesian pilgrims might not be the same, therefore the comparison between the ASDR of the pilgrims and the general population can not be made.

4.5. Analysis analyse relative risk of death for high risk pilgrims compared to low risk pilgrims

The test results at category pre-travel diagnosis, show that some group of diseases influenced to the death of Indonesian's pilgrims. Endocrines disorders, circulatory system and digestive system diseases have OR varied from 1.48 – 2.24 with 95% CI varied from 1.06 – 4.48 and p-values all < 0.01. This mean that endocrines disorders, circulatory system and digestive system diseases were risk factors to the death.

The test results do not show any significant for digestive system and other pre-travel diagnosis with OR < 1. In the groups of pre-travel diagnosis digestive systems, only 3 deceased who had the pre-travel diagnosis, and in the groups of other pre-travel diagnosis, diseases of the musculoskeletal system and connective tissue were 4 deceased, and injury and other infectious diseases each 1 deceased.

These findings already expected as the risk of dying from those diseases increase as one getting older. Furthermore we found that male pilgrims have higher risk to die during pilgrimage than female pilgrims.

The available data did not allow to do a multivariate analysis. However we could study whether the death rate in most frequent pre-travel diagnosis were different based on gender and compared them to the healthy group (table 13). Male pilgrims relatively have higher death rate in the three most frequent pre-travel diagnosis compared to female pilgrims.

The relative risk (RR) of dying for the three most frequent pre-travel diagnosis varied from 1.48 – 2.24, attributable risk (AR) varied from 1.03 – 2.67, and attributable fraction (AF) varied from 69.6% - 119%. This means

that if all pilgrims with most frequent pre-travel diagnosis did not go to Mecca to conduct the pilgrimage, it would be likely that as much as 65 death regarding the three most frequent pre-travel diagnosis could be prevent during the pilgrimage.

Even though this finding could give suggestion that those with pre-travel diagnosis, especially endocrines disorders, circulatory system disorders and respiratory system disorders, that they better not conducting the hajj pilgrimage, but they would go anyway. So that, the possible preventive intervention to be done is by improving the health services provided to the pilgrims during the pilgrimage rather than preventing people not to conduct the pilgrimage.

These findings gives challenges for the government to improve the health services regarding the three most frequent pre-travel diagnosis: endocrines disorders, circulatory systems disorders and respiratory systems disorders. Advices should be given to the pilgrim who has pre-travel diagnosis of endocrines disorders, circulatory systems disorders and respiratory systems disorders to be prepared of their medical condition need.

The government should provided better drugs and equipments in terms of availability and quality for endocrines disorders, circulatory systems disorders and respiratory systems disorders.

Chapter 5: Conclusion and Recommendation

Based on this analysis of the problems of high risk factors and any other factors which influence these risk factors to the illnesses and death of the Indonesian pilgrims, a number of conclusions and recommendation seem to be warranted.

There is incomplete data regarding the pilgrims' details of those departed to Saudi Arabia regarding the age group and gender. There is also no available data regarding the health seeking behavior during the pilgrimage in Saudi Arabia.

We have analyses the data pre-travel diagnosis including gender, and we found that risk factor co-related with death. Therefore, it is good to look at the risk factors during the pre-screening.

The risk factors that co-related with death are: age group, gender and pre-travel diagnosis. Age groups of older than 50 years old are relatively have higher risk to die during the pilgrimage. Male pilgrims have higher risk to die compared to female pilgrims. The pre-travel diagnosis that related to die during pilgrimage are endocrines disorders, circulatory system disorders and respiratory system disorders.

In this case, recommendation should be given to the government, especially Sub-Directorate Hajj Health Directorate General Disease Control and Environment Health, Ministry of Health of Republic Indonesia regarding the recording and reporting system.

For medical examination in PHC and DH, there should be more emphasize given to the doctors and paramedics regarding the health condition that should be examined and coding the diagnosis based on ICD-X codes.

The health books should be provided to the PHC prior to medical examination, so that the result could be written in the health books promptly.

The number of health workers in Saudi Arabia should be increased, especially doctors with specialty in internal diseases, cardiologist and pulmonologist. The number of sanitarian/epidemiologists should be increased, because they were not doing the task of sanitation and epidemiology only, but also doing the daily recording and reporting of health services utilization. Therefore the information system could be improved.

The medical equipments and medication regarding circulatory and respiratory system disorders should be improved as most deceased pilgrims diagnosed in the groups of circulatory and respiratory system disorders.

As age groups of 50 years and older have higher risk than age group below 50 years, pilgrims might be advised to conduct the pilgrimage in younger

age. For pilgrims with pre-travel diagnosis should be advised to take along their medication and be advised for healthy diet.

For organization regarding the hajj pilgrimage: Ministry of Religious Affairs of Republic Indonesia and Hajj Group NGO, they should give more information/enough information to the pilgrims regarding the duty of conducting the hajj that hajj is just an obligation for those that capable to do so, including the health condition.

A more depth and detailed study regarding the hajj pilgrimage, especially the knowledge, attitude and practices of pilgrims during the pilgrimage, need to be proposed in the coming year.

References are missing in this version