



Thunderstorms and Lightning: The New Natural Disaster in Bangladesh

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ABSTRACT

Thunderstorm and Lightning is a natural hazard. It is one of the most widespread and lethal Disasters in Bangladesh. The main objective of this paper is to create awareness regarding thunderstorm among the mass people. The people have believed in misconceptions and myths on thunder. Statistics of lightning fatalities and injuries are difficult to obtain as imperious reporting. Lightning was caused by powerful electrical discharges in clouds. Thunderstorm have appeared with great horror at present. In the context of Bangladesh, Lightning has become a health issue that requires urgent action. Preventive measures should be taken to minimize the hazardous effect of thunderstorm.

Keywords: Lightning, Global Warming, Disaster, Deforestation, Harmony, Misconception, Prevention, Incidence, Awareness, evapotranspiration.

Introduction:

Thunderstorm is a localized storm which causes Lightning and thunder and often brings heavy rainfall, hail as well as gusty winds. When the temperature rises, hot moist air rises upward direction which is known as updrafts. At the same time the cool air sinks downwards and this is called downdrafts. The updrafts and the downdrafts collide with each other and creates cumulonimbus clouds and it produces lightning and thunder. Thunder is created when lightning passes through the air. The lightning discharge heats the air rapidly and causes it to expand. The temperature of the air in the lightning channel may reach as high as 50,000 degrees Fahrenheit and creates plasma state which is 10 times hotter than the surface of the Sun. Immediately after the flash, the air cools and contracts quickly. This rapid expansion and contraction create the sound wave that we hear as thunder. At the 1752 Benjamin Franklin discovered that lightning was caused by powerful electrical discharges in the clouds. Thunderstorms and Lightning occurs almost everywhere on Earth surface and in recent decades its fatal effect goes upward in term of Bangladesh. At present, it becomes one of the most hazardous convective weather events.

Methods:

The articles are based on data analysis from various source of electronic and print media. Besides, the analysis of charged particle be added with that to find out the fatal effects of lightning in the field of physics. Here, we have tried to know the property of charged particle from various books and international science journal to make a suggestion regarding this incidence. At last, we suggest some preventive measures to reduce the fatal impact of such hazard which is going to be a burning issue in our green planet.

National and International Newspaper and electronic media used to analyze the recorded data.

Table-01

Type of Newspaper/ Electronic Media	Name of the Newspaper/ Electronic Media
National Bengali Newspapers	Prothom Alo, Samakal, Ittefaq, Bangladesh Protidin
National English Language Newspapers	The Daily Star, The Daily Sun, The Financial Express.
International Newspapers	The Guardian, The Washington Post
International Electronic Media	National Geographic, Fox News, Reuters
Online News Portal	Bdnews24.com, Dhaka Tribune, Bangladesh Post, The Asian Age,

	The Business Standard
Website	www.aljazeera.com www.bbc.com www.cnn.com www.hindustantimes.com www.britanica.com www.quora.com www.risingbd.com

1. What is Thunderstorm:

Thunderstorm is the combination Thunder and Lightning. The rapid expansion of air surrounding the lightning bolt. Lightning is form of electricity surge in the atmosphere. When clouds of negative charge and clouds of positive charge be connected, up to one billion watts of electricity blast upwards in the atmosphere. Here, the loud noise is known as thunder and the flash is known as lightning. The grumbles and growls we hear during thunderstorm. Thunderstorms keep the electrical balance of Earth.

2. The Causes of Lightning and Thunderstorms:

Lightning is a natural phenomenon. Lightning transform electrical energy into heat, light and sound energy. When warm moist air meets with cold dry air, then the water vapors condense in air and creates thunderstorm clouds. At the time of this condensation of clouds it releases heat energy. As the thunderstorm progresses, eventually the rain cools the entire process down and the energy is gone. This natural phenomena by which the Earth is electrically negative and the atmosphere is electrically positive. The Thunderstorm clouds creates an electric field and positive and negative charges be separated into poles. By gathering more clouds the amount of charges be increased rapidly. Besides, Lightning is form of electricity in the atmosphere. The charged particle will always flow where there is less particle of same charges that means that are in lower potential. Here, the negative charge effuses from the cloud seeking out a path towards the ground. When the negative charge gets close to the ground, a positive charge reaches up to meet with negative charge and thus create a channel. For that, we see lightning bolt flickering through the channel till the completion of discharge. The loud noise is known as thunder and the flash is known as lightning. Lightning and Thunder occurred simultaneously but we have observed those phenomena in different times. Since the speed of light is much faster than the speed of sound. So, we heard sound after few seconds.

3.Types of Lightning:

There are various types of Lightning such as-

- 1) Cloud to Ground Lightning
- 2) Ground to Cloud Lightning
- 3) Cloud to Air Lightning
- 4) Intra-Cloud Lightning

All Lightning can be happened with the electric force, but can release energy or discharge in different ways.

4. Findings from Online Portal and Media:

In recent decades, Bangladesh has had a high risk of Lightning and Thunderstorm. According to National Geographic channel, Lightning storms in Bangladesh occur mostly in May-June. During this time temperature will become high.

Many people of North Bengal region of Bangladesh strike with lightning. Some Media also mentioned that, the deforestation is the main cause of thunderstorm. The felling of tall trees is a contributing factor for lightning. Besides, the uses of metal object, such as mobile phone towers, electronic power distribution towers can be a factor of lightning deaths. In rural areas, taller trees usually attract lightning flashes especially the palm trees, the betel trees, the coconut trees, be going down rapidly. Deforestation is the main cause of such Disaster in Bangladesh.

5. Victims of Lightning and Thunderstorms:

We have found that, males are mostly affected by lightning injuries. The village people are mostly the victims of thunder. The rural communities were hit by lightning in the summertime, in the afternoon. The people living in rural areas have a number misconceptions including religious myths and superstitions. Besides, the farmers who are working in fields are the main victim of thunderstorm. They are not aware much about thunderstorm. Besides causing deaths, lightning strikes leave many of their victims including memory loss, dizziness, weakness, numbness, and other life-altering ailments.

6. Statistics of Thunderstorm in Bangladesh:

As per Geographical location Bangladesh are in vulnerable position of thunderstorm. According to the report of various electronic media, about 300 people die every year in Bangladesh due to thunder and lightning. Among them 51% of the fatalities were farmers those were performing their daily activities in outdoor fields. In addition, the youngest person who died from lightning was (12-15) years old and the oldest lightning victims age between (65-70) years. In 2016, Bangladesh had seen 329 deaths due to lightning strikes. In 2017, 262 deaths and 57 were injured. According to the Health Operation Center & Control Room, Directorate General of Health Services of Ministry of Health and Family Welfare, in 2018 total deaths and injuries were 120 and 77 respectively due to lightning arrest. In 2019, 198 people were killed by lightning strikes and 255 in 2020. Lightning strikes killed over 300 people in 2021. At 13 lightning fatalities, 2022 has already seen more deaths from lightning than all of 2021. According to the Ministry of Disaster Management and Relief and the Non-Governmental Organization Disaster Forum, some 3162 People have died in lightning strikes from 2011 to 2021.

7.0. Deforestation, Global Warming and Thunderstorm:

Bangladesh, a delta country which is surrounded by the Bay of Bengal have been experienced more frequent and lethal lightning strikes as consequences of Climate Change and Global Warming.

Scientist says that, the increasing Global Warming is responsible for thunderstorm and lightning. The online media REUTERS, reported that, Global Warming is causing more water evaporation, increasing cloud formation in sky and for that the amount of rainfall and the potential lightning storm in recent years. Bangladesh Government declared Lightning is a disaster after the incidence of Lightning event in May 2016. Lightning strikes mostly during pre-monsoon, monsoon and post monsoon seasons. But due to changing weather patterns this period is not happen in times and it is widening in a long-term period. We know that forests have played a vital role in keeping ecological balance. Forests are crucial to fighting climate change. Deforestation is increasingly influencing the Earth temperature and as a result the climate be changed. Since forest absorb carbon di oxide, destroying them amount of carbon di oxide increasing in the atmosphere and be a factor of Global Warming by absorbing the Sunlight. The devastating consequences of Global Warming impact on people and the planet. As the heat waves, droughts, floods and thunderstorms be associated with climate change become more frequent and more intense. Communities suffer and death tolls rise. The Deforestation directly affects the rainfall. Much of the rainfall over tropical forests comes from water vapor that is carried by the atmosphere. But a large component is recycled rain water that is pumped by trees from soil into the atmosphere through a process called evapotranspiration. Deforestation reduces evapotranspiration and water recycling process disrupt. This decreases the amount of moisture carried away by the atmosphere, reducing rainfall in which the moisture is transported and thus creates imbalance in moist in atmosphere. As a result, thunderstorms and lightning be increased in a high scale in recent years. Another study has shown that there is a correlation between temperature rise and thunderstorm. The researchers said, due to one degree increase in temperature lightning increases ten times than previous.

8.0. Preventive and Safety Measures to Lessen Lightning:

Some preventive measures to be taken to reduce the thunderstorm lightning. The following safety measures can be followed by individuals which is helpful to safe from lightning strikes. We have known, "Prevention is better than cure." So, Government as well as we must be conscious about the importance of trees.

8.1. Afforestation Should Be A Prevention:

Trees can reduce air and environment pollution. It prevents Global Warming and also having impact in reducing thunderstorm & lightning. So we should plant more trees to maintain ecological balance and to maintain harmony between man and nature to save our environment. Trees can be produced on the banks of ponds, rivers, on both sides of highways and railways, on the bank of dams etc. The more we plant trees, the more we do good to ourselves. Betel, Coconut, Date and Palm trees can be planted more in all open spaces. The Meteorologists says that, there tall trees protect from lightning. In 2017, the Government of Bangladesh took a decision to plant one million palm trees across Bangladesh to advert deaths occurring from lightning strikes.

8.2. Install Lightning Arrester:

Lightning Arrester are used to protect electrical appliances, lightning produced extreme high voltage that will be induced in incoming power lines can damage electrical home appliances or even cause death. By using Lightning Arrester, we can keep our home safe from thunderstorm lightning.

8.3. Install LPS to Protect Thunderstorm:

A Lightning Protection System (LPS) is essential to ensure the safety, security and maintenance of structures against the fatal impact of thunder and lightning. Light Protection System (LPS) transfer the electricity comes from lightning to the ground. LPS provided a low resistance path (made up of metal conductor) to dissipate high voltage current into ground. LPS consist of an air termination system, a down conductor system, and on Earth termination. All electrical appliances can be protected by installing a Lightning Protection System. In the absence of LPS, electricity comes from a

lightning strike may use any conductors as a path to reach to the ground. This path could be included as telephone cables, power cables, water or gas pipes or the structure of steel or metal frame.

8.4. Be Safe in Indoor During a Thunderstorm:

1. Avoid showering or bathing during lightning. Plumbing and washroom fixtures can conduct electricity.
2. Unplug electrical appliances of home such as TV, Computer, Air Conditioner, Fridge or any other instrument. Power fluctuates from lightning can cause serious damage of that appliances.
3. Maintain a proper distance from metal object.
4. Get inside at home, building or in an automobile. Although you may be injured if lightning strikes your car, you are much safer inside a vehicle than outside.
5. When thunderstorm occurs in your area, must be postponed your outdoor activities.
6. Make a distance from your mobile phone and if lightning intensity goes high then it will be safe to switch off the mobile phone.
7. Stay away from a concrete wall because lightning can travers through metal wire or metal bars in a concrete wall.
8. If you are in a group during thunderstorm, separate from each other. This will reduce the number of injuries of lightning danger.
9. During a thunderstorm avoid your open vehicles such as Bicycle or Motorcycle, Rickshaw and so on.

8.5. Be Safe in Outdoor During a Thunderstorm:

If you are outside during thunderstorms, you must be avoided the following.

1. Natural Lightning attracts tall trees, so avoid tall and isolated trees in an open area.
2. Avoid hilltops, open fields, the sea beach the bank of river, closest to pond or a boat which is floats on water.
3. In open areas, isolated sheds or other tinny structures must be avoided to secure from lightning.
4. In an open place avoid high place and try to search low places. Because Lightning electricity discharges through a carrier which is high in a certain area.
5. In a forest area try to seek shelter in a low area with small tress or bushes and avoid the trees which is taller than any other trees.
6. If you feel your hair stand on end, a lightning strikes is about to be happened. In that situation one's can be followed the following.
 - i) Squat low but do not lie down
 - ii) Make yourself the best possible smallest target
 - iii) Place your hands over your ears and head between your knees and be seated down
 - iv) Being prepared in advance and ensure your safety.

9. Probable Symptom of Lightning:

According to research, you can use a 30-30 rule for getting early sign of thunderstorm happening. In this rule, after you see Lightning, you start counting till 30. If in case, you hear the sound of thunders before you reach 30, find an indoor for your safety. Also, you can suspend your outdoor trip and activities.

10. Misconception Regarding Magnetic Pillar:

Mass people had believed that, magnetic pillars can prevent lightning and thunderstorms.

From the analysis of various data and scientific experiment we have found that, there is no proof regarding that issue. According to published news at daily 'Prothom Alo' the pillars had been placed in the ground during the British Rule. A few years after the 1757 Battle of Plassey, the East India Company for the first time took initiative for a land survey. The pillars having magnetic property so that, if the pillars sunk into the ground during heavy rains, floods, other metals could be used to detect these. There is no scientific proof that the pillars or boarder pillars prevented lightning strikes. Besides, there is a misconception that, these pillars contain a rare metal namely Iridium. Iridium is one of the rarest elements in Earth crust. According to an article published in daily 'Prothom Alo', the director of Atomic Energy Commission of Bangladesh said that, these pillars were tested by means of X-ray fluoresces techniques to determine the composition. So far, they have detected the presence of Calcium, Iron, Silicon and Titanium but there is no presence of Iridium. British Government posted Mouza (Small boundary of lands) pillars are now formatted as high precious metal. This is based on a belief that,

inside the pillar materials converted to Iridium metal when strikes with electric sparks of high voltage lightning of any thunderstorm. By searching these magnetic pillar the number of people being killed in lightning strikes. The Swindlers also continue to illude the people through this misconception.

11. Conclusion:

Lightning strikes are dangerous and can be a reason of huge risk of serious injury and even death. The best defense from thunderstorm and lightning is to avoid lightning. Check the weather forecast before going in outdoor activities. If the forecast calls for thunderstorms, then you can postpone your journey or outdoor procession. People should be made aware that, they shouldn't be in the open field when black clouds gather in the sky. Besides, Lightning Arresters can be installed in the field across the country for the safety of our village farmers. If anybody gets hurt by Lightning Thunderbolts, try to take him to the nearest hospital as early as possible. At last, all of us need to take thunderstorm seriously because it is newly disaster in recent years.

12. Synthesis and suggestions:

Thunderstorms are known to occur in almost every region of the world. The consequences of Lightning more hazardous than any other natural disaster. For the high densely populated country like Bangladesh rural communities are 70% of the total population. The rural communities are mostly believing in myths and misconceptions. To eradicate this misconception awareness program is very essential. Some suggestion can be relevant regarding this factor.

- Lightning Arrester Must be set up to build structure or constructions. To ensure the installation of lightning arrester Government should be focused on that.
- Lightning Arresters can catch the thunderstorms can catch the thunderbolts in the absence of trees. For that, many electric poles can be turned into lightning arrester very easily.
- Lack of awareness are the main reasons behind the growing casualties of being Lightning. By increasing awareness program through media, we can reduce the death rate of lightning casualties. Awareness is conclusive to lessen the destructive impact of lightning.
- Taller trees can be a protection from thunderbolts strikes. As a long- term protection an initiative to be taken by the Government to plant date palm, fan palm, betel nut, coconut trees in forlorn places.
- Weather Forecasting System should be developed so that, People can be aware half an hour before the possible lightning beset.
- Concrete shelter might be built in Haor's, Baor's, Beel's as farmers and fisherman are being the worst victim of Lightning danger.

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