1. INTRODUCTION

Asbestosis is a chronic inflammatory and fibrotic medical condition affecting the parenchymal tissue of the lungs caused by the inhalation and retention of asbestos fibres. It usually occurs after a high intensity or long term exposure to asbestosis, particularly in those individuals working on the production or end use of products containing asbestos (Berman *et al*., 2003). This disease of asbestosis is usually referred to as an occupational lung disease.

 Asbestosis leads to a gradual thickening of the lung tissue and the lining of the chest cavity, which can make the flexible lung tissue as thick and stiff as an orange peel. The prolonged accumulation of these fibres in human beings lungs can cause scarring of lung tissue and shortness of breath. Asbestosis symptoms may range from mild to severe and generally takes fifteen to thirty years to appear. Exposure to asbestos can also lead to other diseases such as Mesothelioma and lung cancer (Cooke, 1984).

2. EXPLANATION OF ASBESTOS

Asbestos is a mixture of chemicals that occur naturally as a fibre substance and was widely used in the building industry for insulation roofing and fireproofing. 

figure 2.1

Asbestos is a commercial term applied to a variety of silicate minerals that readily separate into thin strong fibres that are highly flexible, heat resistant. Most of the people with asbestosis acquired it on their jobs before the federal government began regulating the case of asbestos and asbestos products in the mid-1970s. Today its handling is strictly regulated. Acquiring asbestosis is extremely unlikely if you follow your employer’s safety procedures. Treatment focuses on relieving your symptoms (Mason, 2010).

2.1. TYPES OF ASBESTOS

* Chrystotile-also called white asbestos. Chrysotile asbestos is unique in that it has a serpentine fibre formation (curled fibres) compared to the amphibole fibre formation (straight, needle like fibres). Chrysotile asbestos is less likey to be inhaled than other types of asbestos, it is therefore viewed by many to be the safest of the asbestos types.
* Amphibole asbestos-those fibres that stay in the lungs longer than crysotile and this tendency may account for their increased toxicity (harmfulness to the body). There are five types of asbestos found in the amphibole group namely amosite, crocidolite, anthphyllite, tremolite and actinolite. Amosite and crocidolite are the most hazardous of the asbestos minerals because of their long persistence in the lungs of exposed people. The crocidolite, tremolite and amosite are the three most common cause of the Mesothelioma through the asbestos exposure (Berman et al., 2003)

3. PEOPLE WHO ARE MOST VULNERABLE TO ASBESTOSIS

Anyone who has an ongoing direct or secondary exposure to asbestos containing products can be affected by asbestosis. But not everyone who is exposed to asbestos will be affected by this disease, but everyone who has indeed been exposed to high quantities of asbestos fibres. Those at the highest risk encounter asbestos at regular basis at their working places. The occupations include shipyard workers, rail road workers, power plant workers, steel mill workers, oil refinery workers, fire fighter. (Cooke, 1984)

Also people with extensive occupational exposure to the mining, manufacturing, handling or removal of asbestos

4. CAUSES

Asbestosis is a very serious and deadly disease with asbestos known as its only source. Asbestos can be found naturally in the air outdoors and in some drinkable water from natural sources. Asbestos from natural geologic deposits is known to be naturally occurring. Health risks associated with exposure to naturally occurring asbestos are mostly found in people living near rock deposits likely to include asbestos.

* How asbestos causes asbestosis

When a person breathes in fresh uncontaminated air, that air travels through the trachea and into one of the two bronchi, where the air may pass into smaller passages. If you are exposed to high levels of asbestos dust over a long period of time some of the airborne fibres can become lodged within the alveoli (the tiny sac inside the lungs where oxygen is exchanged to carbon dioxide in human’s blood). The asbestosis fibres irritate and scar the lung tissue interfering with its ability to deliver oxygen to the body.

 When asbestosis progresses more and more the lung tissue becomes scarred and becomes so stiff that it cannot contract and expand eventually. Smoking cigarettes appears to increase the retention of asbestos fibres in the lungs and often results in a faster progression of the disease.

How severe the disease is depends on how long the person was exposed to asbestos and the amount he or she breathed in. Often people do not notice symptoms for 20 years or more after the asbestos exposure. Asbestos fibres were commonly used in construction before 1975. Asbestos exposure occurred in asbestos mining and milling construction and other industries Families of asbestos workers can also be exposed from particles brought home on the workers clothing (Samet, 2007).

Asbestos fibres can cause cancer many years after exposure, there are two types of cancer formed.

* Cancer in the lung itself- this accounts for 50% of total asbestos indeed cancers. It is hard to diagnose, it spreads fast and it is rarely cured.
* Cancer of the lining of the lung or abdomen. This is Mesothelioma and is almost always by exposure to asbestosis (Sporn *et al*., 2004).

5. WAYS IN WHICH PEOPLE ARE EXPOSED TO ASBESTOS

 Figure 5.1

We are all exposed to low levels of asbestos in the air. These “ambient” or typical-air concentrations of asbestos fibres are 0.00001 to 0.0001 fibres per milliliter (fibre/Ml). Much more concentrated levels of exposure are known to cause health effects in humans.

Many people have come into contact with asbestos fibre through their jobs (occupational exposure). Some of the work environments or occupations in which workers are now or were exposed in the past include mining operations, asbestos product manufacturing (insulation, roofing and building materials) power plants, construction sites, automotive repair (brakes and clutches), oil refineries etc.

* Mining activities-exposure to tremolite asbestos Ca type or amphibole asbestos can occur in workers involved in mining, milling and handling of other ores and rocks containing tremolite asbestos (such as talc). Residents who live near mining, milling or manufacturing sites that involve tremolite asbestos containing material may be exposed to higher levels of airborne asbestos.
* Insulation and building materials-Amphibole asbestos can be found in a variety of building materials such as insulation or floor tiles and cement pipes. Amphibole asbestos has been found in some vermiculite sources used as home and building insulation.
* Consumer products-vermiculite was also commonly sold in gardening and hardware stores. It was used as soil amendment or fertilizer carrier and it was an ingredient in many potting soil mixtures. Small amounts of amphibole asbestos have been found in some talc containing crayons(Sporn *et al.,* 2004)

6. SYMPTOMS

Signs and symptoms of asbestosis do not manifest until after an appreciable latency (time since first exposure), often several decades under current conditions in the United States. The primary symptom of asbestosis is generally the slow onset of dyspnea, especially on exertion. The effects of long term exposure to asbestos typically don’t show up for at least twenty to thirty years after the initial exposure.

Symptoms exacerbates asbestosis significantly, many of the people who develop the disease believe that early symptoms are simply related to tobacco consumption. Such symptoms include:

* Coughing-persistent coughing that is not caused by a bronchial condition, a respiratory intention or a cold. Generally it’s a dry hacking cough.
* Shortness of breath-it is by a diminished lung capacity. It occurs only with exertion, but eventually it will happen even while you’re resting. The ability to engage in physical activity is reduced accordingly.
* Chest pain-caused in part by the coughing and in part by the strain on the muscles and tendons between the ribs or by the fluid accumulation. It occurs when the disease progresses and you experience an intermittent chest pain.
* Finger deformity- it is caused by the reduced level of oxygen in the blood. The advanced cases of asbestosis sometimes result in finger deformity called clubbing where the tips of the fingers spread out and become rounder (Cowie *et al*., 2010)

7. DIAGNOSIS OF ASBESTOSIS

Asbestosis can be difficult to diagnose because its signs and symptoms are similar to those of many other types of respiratory diseases. A variety of diagnostic tests may be needed to help pinpoint the diagnosis.

* Chest X-ray-asbestosis appears as excessive whiteness in your lung tissue. If the asbestosis is advanced, your entire lung may be affected, giving it a honeycomb appearance.
* Computerized tomography (CT)-CT scans combine a series of X-ray views taken from many different angles to produce cross-sectional images of the bones and soft tissues inside your body. These scans generally provide greater detail and may help detect asbestosis in its early stages, even before it shows up on a chest X-ray.
* Pulmonary function tests-these tests determine how well your lungs are functioning. Pulmonary function tests measure how much air your lungs can hold and the airflow in and out of your lungs. For example, you may be asked to blow as hard as you can into an air measurement device called a spirometer. Some pulmonary function tests can measure the amount of oxygen being transferred to your bloodstream (Cowie *et.al*., 2010)

8. PREVENTION

Reducing the level of exposure to asbestos is the best prevention against asbestosis. In the United States, the federal law requires employers in industries that work with asbestos products such as construction and shipyard industries to monitor exposure levels create regulated areas for asbestos work and provide their employees with appropriate training, protective gear such as face masks and decontamination hygiene areas. The laws also mandate regular medical exams to detect early asbestosis.

Many homes built before the 1970s contain asbestos in such items as:

* Building insulation
* Insulation for hot-water and steam pipes
* Soundproofing and decorative material sprayed on walls and ceilings.
* Roofing and siding shingles
* Vinyl floor tiles

Generally, there’s no cause of concern as long as these materials are in good condition and you do not disturb them or cause them to disintegrate. It’s when they are damaged that there is a danger of asbestos fibres being released into the air. And asbestosis occurs only after repeated exposure to a large amount of fibres over many years (Samet, 2007).

9. TREATMENT

Scarred lung tissue cannot be repaired or cured. However the fibrosis caused by asbestosis is not progressive either. Once the exposure to asbestos has stopped the disease will progress to the level dictated by the amount of asbestos fibre in the lungs and stabilize. Treatment for the disease is focused on relieving the symptoms caused by reduced oxygen availability and avoiding other medical problems that may be caused by asbestosis.

One of the primary treatment modalities is putting an end to smoking. Primary concern with the combination of smoking and asbestosis is the onsets of emphysema which will further reduce breathing capability. It may be the most difficult of all the treatment steps. Avoiding pulmonary disease is critical with reduced lung functionality. It is important to avoid the onset of flu or pneumonia, which requires periodic vaccination. The only way to avoid a cold is avoiding exposure to people who are contagious.

Medication may be in order if reduced oxygen supply is leading to high blood pressure. A blood thinner and medication to relax constructed blood vessels may be prescribed by the treating physician. The doctor may prescribe aerosol medication to thin lung fluids. People with this condition may need to receive oxygen by mask or by a plastic piece that fits into their nostrils and certain patients may need a lung transplant.

 Pleural effusion may develop as a result of asbestosis. Accumulation of fluid between the lungs and the ribs or lungs and the diaphragm may be relieved by draining the fluid with a thorocentesis procedure. Oxygen therapy may be an option for periodic treatment if the lungs have reached an advanced state of deterioration.

Doctors can offer treatment drugs known as bronchodilators and people who have asbestosis related breathing problems are sometimes helped by the use of prescription inhalers, which are commonly used by the people who have asthma (Sporn *et.al*, 2004).

10. CONCLUSION

In consideration to the exposure of the mineral asbestos in terms of its fibers, prevention to exposure may be a very much recommended measure of avoiding the infection of the disease i.e. in an area where there is high exposure to asbestos; the candidate exposed may use protective and safety measures available at reach such as dust mask. Also that they may be cases where the disease already exist in the candidate, taking treatment measures is recommended as well since it neutralizes or minimizes the effects of the disease in the body of the candidate. Tests for asbestosis may be also advisable if the candidate has symptoms associated with the disease and as such the candidate may start to take treatments.

 REFERENCES

Berman, K.C., Wayne S.S., Crump B.K., Kenny S.T. (2003). *Final draft: technical support* *document for a protocol to assess asbestos-related risk*. Washington DC: U.S. Environmental Protection Agency. pp474.

Cooke, W.E. (1984). *Fibrosis of the lungs due to inhalation of asbestos dust*. London: BMA (140-3).

Cowie, R.L., Murray J, Becklake M.R. Pneumoconoises In: Mason R.J., Bioaddus V.C., Martin T.R. *et al*, eds*. Murray and Nadel’s textbook of Respiratory Medicine* 5th ed. Philadelphia. Pa: Saunders Elsevier, 2010: chap 65.

Samet, J.M. *Occupational pulmonary disorders*. In: Goldman L. Ausiello D. eds. Cecil Medicine. 23rd ed. Philadelphia, Pa:Saunders Elservier,2007:chapter 93

Sporn, A.B, Thomas A., Rhoggi T.P. (2004). *Pathology of asbestos associated diseases*. Berlin. Springer

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