**THE PRESBYTERIAN UNIVERSITY OF EAST AFRICA**

**SCHOOL OF HEALTH SCIENCE**

**DEPARTMENT OF NURSING**

**TOPIC: NURSING CARE STUDY III (PEDIATRICS)**

**PRESENTED TO THE DEPARTMENT OF NURSING IN PARTIAL FULFILLMENT FOR THE AWARD OF DIPLOMA IN NURSING**

**PRESENTED BY: PHEBEARN A. OCHIEL**

**ADMISSION NUMBER: B10/1012/12**

**PRESENTED ON: 28TH APRIL 2014**

**PATIENT’S BIODATA**

**NAME:** M. A.

**GENDER:** MALE

**IN PATIENT NUMBER:** 289719

**AGE:** 5 MONTHS

**BIRTH** **WEIGHT**: 3.0 KILOGRAMS

**CURRENT** **WEIGHT**: 5.6KILOGRAMS

**RELIGION:** CHRISTIAN

**RESIDENCE:** NDUMBERI

**NEXT OF KIN:** J.N

**RELATIONSHIP**: MOTHER

**CONTACT**: 0725339595

**WARD:** PAEDIATRIC WARD, ROOM 5

**DATE** **OF** **ADMISSION**:31ST MARCH 2014

**DATE OF DISCHARGE:** 10TH APRIL 2014

**DIAGNOSIS:** SEVERE PNEUMONIA

**PRESENTING COMPLAINS**

The child’s mother reported complains of difficulty in breathing, hotness of the body , cough and refusal to breast feed for two days.

**HISTORY OF PRESENTING COMPLAINS**

The mother reports that the child was well until two days ago before the admission, the child developed fever, difficulty in breathing, cough, and refusal to breastfeed. The mother reports to have reduced the clothing, tapid bathe the child and administered paracetamol 2.5 mls but the fevers did not subside, instead it continued to be worse and so she decided to come to the hospital on 31/3/014 for medical intervention. That was when the child was diagnosed with severe pneumonia and was admitted in paediatric ward at Kiambu district hospital.

**PAST MEDICAL AND SURGICAL HISTORY**

The mother reports that the baby had never had any previous admissions and she reports no history of blood transfusion or any surgery done to the child since birth.

**FAMILY SOCIAL AND ECONOMIC HISTORY.**

Mother reports that the baby is their first born child. The mother is married and they live together with her husband as a family. The father works as a casual laborer in one of the construction site in Kanunga and the mother has a grocery in Ndumberi. The mother reports no known history of chronic illness in the family and no history of communicable disease exposure like tuberculosis.

**OBSTETRICS HISTORY**

The mother reports that the pregnancy was carried to term and she attended all the four ante natal clinics, she then delivered through spontaneous vaginal delivery in Karuri health center without having any pre or post delivery complications. She reports that the baby cried immediately he was born. The birth weight was 3.0 Kilograms and the baby was given Bacillus Calmette Guerin (BCG) and Oral polio vaccination.

**IMMUNIZATION HISTORY**

The child’s welfare clinic book indicates that the child is immunized as per The Kenya Expanded Programme Immunization schedule (KEPI). At birth oral polio and BCG were given.

**CHILD DEVELOPMENT (MILESTONES)**

The mother reports that; at 4-6weeks the baby was attentive to familiar faces, the infant could lift his head from time to time, when supported on the shoulder he was able to stare at the source of light for example the window.

At 8 weeks; he was able to kick his feet or push his legs when lying on his mother’s thighs and bath basin. He was also able to pay attention to speaking voices, eyes focused and followed moving objects and he was able to smile to familiar faces.

10-18 weeks; the infant could hold his head steadily while being supported on his mothers shoulder and freely while looking at people.

**NUTRITIONAL HISTORY**

The patient’s mother reports that the baby is exclusively breastfeeding.

ALLERGIES

The mother reports no known drug or food allergies.

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**HABITS**

None of the parents drinks alcohol or smokes cigarette or abuse any substance of abuse.

HABIT

**PHYSICAL EXAMINATION**

**GENERAL** **APPEARANCE**: The patient is sick looking, conscious and alert. He also had labored breathing especially on inspiration.

**HEAD:** On inspection the hair was short, black, well distributed and clean. There were no scars noted on the scalp. On palpation, the posterior fontanel is closed and the anterior fontanel is not closed.

**EYES:** They are both present, well aligned and no discharge, inflammation nor cataract noted. In both eyes, the eyebrows and eyelashes are well distributed and they are black in colour. The conjunctiva is not pale in color and both pupils react to light. No features of squint eyes noted.

**NOSE:** It is present, well formed and aligned with no deformities noted.There was discharge noted and it was clear in color, no swelling, no nasal flaring nor polyps noted.

**EARS:** They are both present, well formed, aligned with both pinnas present. Neither discharge nor inflammation noted. Both ears perceive sound waves well.

**MOUTH:** Is present and well positioned. There is the presence of the tongue with no oral thrush, ulcerations, gum inflammation nor discharge noted. Lips were slightly dry.

**NECK:** On inspection it is well formed and of proportional size. On palpation there were no swollen or enlarged lymph nodes and thyroid glands felt.

**CHEST:** On inspection there was a chest in drawing. There was no scars nor rashes noted on the chest. The respiration rates were 42 breaths per minute. On percussion, hyperresonance was heard. On palpation there was no organomegally and tenderness noted. On auscultation, there were bilateral crackles at the bases of the lungs and the apical pulse was **143 beats per minute**. There was slight wheezing noted.

**UPPER LIMBS:** Both of them are present, equal in size with no deformities, skin lesions and no inflamed axillary lymph nodes felt or detected. There is presence of BCG scar on the left hand with a fixed intravenous cannula on the right hand. All the phalanges of both hands are present and are of normal size and length. There is full range of movement at all the joints of both hands. The axila temperature was **42.9o c** and the radial pulse of **143 beats per minute**.

**ABDOMEN:** On inspection, there were no rashes or visible injuries noted and the abdomen was not distended. The navel scar was present and it was not inflamed. On auscultation, the bowel sounds were present. On percussion, a dull sound was detected. On palpation, the patient had no abdominal tenderness, no masses felt or any sign of organomegally felt.

**GENITALIA:** The child had no scars nor rashes noted. The genitalia was well formed with no discharge noted from the penile urethra, lesions or ulceration noted on the genitalia. No inflammation/swelling felt of the inguinal glands. The testes were all descended on palpation.

**LOWER LIMBS:** They are both present, well formed and of equal size and length. All the toes are present, of normal size and length with no extra digits noted. There was present of planter flexion. No any skin lesion and edema noted. The child was able to stand with support.

**BACK:** On inspection both gluteus muscles were present and of equal size. There were no growths, curves, rashes nor scars detected. On palpation there was spinal and vertebral column continuity and there was no any tenderness. On examination of the sacral region there was no edema noted.

**INITIAL MANAGEMENT BEFORE THE DOCTOR ARRIVAL**

Upon arrival in the casualty at around 11:45am, the child was assessed of which he had difficulty in breathing, and chest indrawing, he was put on oxygen via nasal prongs 1litre/ minute. His vital signs were taken of which the temperature was 42.9 degree celcius, respiration rates of 46breaths/minute and radial pulse of 143 beats/minutes. Paracetamol 2.5mls was administered after exposing the baby with no improvement. Blood samples were taken for full haemogram, and malaria parasite test.

An intravenous line was inserted and the patient was given Rigers Lactate 200 mls to run for one hour. After observation for one hour there was no much improvement the baby was reviewed by a physician who recommended for the admission of the baby for further management.

**ANATOMY AND PHYSIOLOGY OF THE RELATED SYSTEM**

**THE RESPIRATORY SYSTEM**

The respiratory system is a combination of organs that works to facilitate taking in of oxygen and giving out carbon dioxide in the human body, this is achieved through breathing. The system comprises of the following organs:

**A)Upper respiratory system (upper air way)**

1. Nose
2. Pharynx
3. Larynx

**B)Lower respiratory system**

1. Trachea
2. 2 bronchi
3. Respiratory bronchioles
4. Terminal bronchioles
5. 2 lungs
6. Intercostal muscles and the diaphragm.

**NOSE AND NASAL CAVITY**

This is the main route of air entry, it consist of a large irregular cavity divided into two equal passages by a septum. The nasal lining consists of vascular ciliated columnar epithelium which contain mucus secreting goblet cell. The roof is formed by the cribriform plate of the the ethmoid bone and the sphenoid bone, frontal and nasal bone whereas the floor is formed by the roof of the mouth and consist of the hard palate in front and the soft palate behind and has involuntary muscle. The medial wall is formed by the septum and the lateral wall is formed by maxilla, ethmoid bone and inferior conchae. The posterior wall is composed of the pharynx.

**Functions of the nose**

1. Warming of the air – The air is warmed due to immense vascularity of the nasal mucosa.
2. Filtering and cleaning of the air – The hairs at the anterior nares trap larger particles that settle and adhere onto the mucus.
3. The nose also plays a role in the sense of smell( olfaction)\_ As the nerve endings that detect smell are allocated in the roof of the nose in the area of the cribriform plate of the ethmoid bones and the superior conchae.
4. Humidification\_ This happens as air travels over moist mucosa, it becomes saturated with water vapour.

**THE PHARYNX**

This is a tube 12 – 14 cm long that extends from the base of the skull to the level of the 6th cervical vertebrae. The pharynx lies behind the nose, mouth and larynx and is wider at its upper end. The pharynx is divided into:

1. **Nasopharynx:** Is the nasal part which lies behind the nose. The lateral walls consist of two opening leading to each middle ear (auditory tubes). Posteriorly there are the pharyngeal tonsils (adenoids). They consist of lymphoid tissues and it is made up of ciliated columnar epithelium
2. **Oropharynx:** Is the oral part which lies behind the mouth from below, at the level of soft palate to the level of upper part of the body of the third cervical vertebrae. During swallowing the oral and nasal parts are separated by soft palate and uvula. Oopharynx is made up stratified squamous epithelium.
3. **Laryngopharynx:**  Extends from oropharynx above and continuous as the esophagus below i.e. level of 3rd – 6th cervical vertebrae and is made up stratified squamous epithelium.

The pharynx has submucosa which is rich in mucous associated lymphoid tissues (MALT) and it is also made up of smooth muscles.

**Functions of the pharynx**

1. Provides passage of food and air: It warms and humidifies air as in the nose, the air is further warmed and moistened as it passes through the pharynx.
2. Warming and humidification of air
3. Hearing – auditory tube extends from the nasopharynx to each middle ear, allowing air entry to the middle ear and since satisfactory hearing depends on the presence of air at atmospheric pressure on each side of the tympanic membrane (eardrum).
4. Taste – Pharynx has olfactory nerves for the sense of taste in the epithelium of oral and pharyngeal parts.
5. Acts as a resonating chamber for sound ascending from the larynx, it helps to give the voice its individual characteristics.

**LARYNX (VOICE BOX)**

It links the laryngopharynx and the trachea .It lies in the level of the 3rd ,4th ,5th and 6th cervical vertebrae. The larynx is made up of irregular shaped cartilage attached to each other by the ligaments and the membranes. The cartilages are: 1 thyroid cartilage, 1cricoid cartilage, 2 arytenoid cartilages and 1 epiglottis cartilage which act as the lid of the larynx. The ligaments are: crico-arytenoid and crico-thyroid and the membranes thyroaryoid and cricovocal. The interior part consists of vocal cord and between them there is a space called glottis.

The blood supply is by the superior and inferior laryngeal arteries and drained by the thyroid veins which joins the internal jugular vein.

**Functions of the larynx**

1. It determines the properties of sounds i.e. pitch, tone and volume hence helps in production of sound.
2. Speech is produced when sounds produced by the vocal cords are manipulated by the tongue, cheeks and lips.
3. Protection of the lower respiratory tract through the epiglottis which act as a lid.
4. Passage of air since it links the pharynx above with the trachea below hence enabling air to pass.
5. Humidifying, filtering and warming of the air.

**TRACHEA (WINDPIPE)**

It is the longest airway and it is approximately 10 – 11 cm long and lies mainly in the medial plane in the front of the oesophagus. It is a continuation of the larynx and extends downwards to about the level of 5th thoracic vertebrae where it divides at the carina into the left and the right primary bronchi. The blood supply is mainly by the inferior thyroid and bronchial arteries and the venous return is by the inferior thyroid veins into the brachiocephalic veins. Trachea is composed of three layers of tissues held open by 16 – 20 incomplete (C- shaped) rings of hyaline cartilage lying one above the other. They include:

1. **Outer** **layer** – contains fibrous and elastic tissue and encloses the cartilage.
2. **Middle** **layer** – consist of cartilages and smooth muscles.
3. **Inner** **layer** – consist of ciliated columnar epithelium; containing mucous secreting goblet cells.

**Functions of the trachea**

1. Support and patency – The tracheal cartilages hold the trachea permanently opened but the soft tissues band between the cartilage allows flexibility so that the head and the neck can move freely without obstructing and kinking the trachea.
2. Mucociliary escalator – Is the synchronous and regular beating of the cilia of the mucous membrane lining that wafts mucus with adherent particles upwards towards the larynx where it is either swallowed or coughed out.
3. Cough reflex\_ Nerve endings in the larynx, trachea and bronchi are sensitive to irritation, which generates nerves impulses.
4. Warming, Humidifying and Filtering of air continues just like in the nose.

**THE LUNGS**

There are two lungs which are cone-shaped organs, one on each side of the midline in the thoracic cavity. They have an apex, a base, a tip, costal surface and medial surface as follows:

1. **Apex:**  Is the narrow superior tip of the lungs. It is rounded, rises into the root of the neck approximately 25 mm above the level of the middle third of the clavicle.
2. **Base:** It is concave, semi-lunar in shape lying on the upper thoracic surface of the diaphragm.
3. **Costal surface:** It is convex and lies directly against costal cartilage, the ribs and intercostals muscles.
4. **Medial surface:** It is concave, has a roughly triangular shaped area called hilum where the structures forming the root of the lung enter and leaves.
5. **Mediastinum:** Area between the two lungs which is occupied by the heart, the great vessels, trachea, bronchi, esophagus, lymph node, lymph vessels and nerves.

The right lung is bigger and is divided into three distinct lobes namely: Superior lobe, middle lobe and inferior lobe. The left lung is smaller because the heart occupies the left side, they are two distinct divisions including: The superior lobe and the inferior lobe. Divisions between the lobes are called the fissures.

**Pleural and pleural cavity**

Pleura is a slippery serous membrane that helps the lungs to move smoothly during each breath. There are two layers namely:

1. **Parietal** **pleura**: Is adherent to the inside of the chest walls and thoracic surface of the diaphragm.
2. **Visceral** **pleura**: it is the inner layer which adheres to the lung covering each lobe and passing into fissures that separate them.

**The** **pleural** **cavity** – Is the space that separates the two pleura. It contains pleural fluid which is a thin film of serous fluid which allows the pleura to glide smoothly over each other as the lungs expand and contracts preventing friction during breathing. If either layer of the pleura is punctured, underlying lung collapses. Pleural cavity does not contain air.

**Interior** **of the lungs** : Consist of bronchi, bronchioles, blood vessels and lymph vessels, nerves and connective tissue all forming a lobe. Each lobe is made up of a large number of lobules.

**Pulmonary blood supply**

The pulmonary vessel are divided into left and right pulmonary arteries; which carries deoxygenated blood to the lungs. Within the lungs each pulmonary artery divides into many branches, which eventually end in a dense capillary network around the alveoli walls. Exchange of gases between air in alveoli and blood in the capillary takes place between two very fine membranes called the respiratory membrane. The right pulmonary artery carries blood to the right lungs and the left pulmonary artery carries blood to the left lungs. The many capillaries join up to form the pulmonary vein in each lung that carries oxygenated blood to the left atrium of the heart.

**Function**\_ Holds the alveoli and provides medium for gaseous exchange.

**BRONCHI AND BRONCHIOLES**

The trachea divides at the level of the 5th thoracic vertebrae into two primary bronchi;The right bronchus and the left bronchus: The right bronchus is wider, shorter approximately 2.5cm long and more vertical than the left hence more likely to become obstructed by an inhaled foreign body. It divides into three branches, one into each lobe and then subdivides further into smaller branches the bronchioles.

The left bronchus is narrower than right and longer approximately 5cm long. It enters the lung at the helium and divides into two one to each lobe and then subdivide into smaller airways the bronchioles.

The blood supply is by the bronchiole arteries and venous return is by the bronchiole veins. The nerve supply is by the vagus nerve.

**Functions of the bronchi and the bronchioles**

1. Control of air entry; contraction and relaxation of smooth muscles helps to regulate the volume and speed of air flowing into and within the lungs.
2. Warming and humidifying air,
3. Protection of the lower respiratory tract by removal of particulate matters hence providing proctection.
4. Support and patency
5. Cough reflex

**THE RESPIRATORY BRONCHIOLES AND ALVEOLI.**

Within each lobe, the lung tissue is further divided into lobules. Each lobe is supplied with air by a terminal bronchiole which further subdivides into respiratory bronchiole, the alveolar ducts and the large number of alveoli (air sacs). Each adult has approximately 150 million alveoli and here is where the process of gas exchange occurs. As the airway progressively subdivides and become smaller and smaller, there walls too becomes thinner and thinner until muscles and the connective tissue disappear leaving a single layer of simple squamous epithelium cells in the alveolar duct and alveoli. Between the squamous cells, there are septal cells which secrets a fluid called surfactant ( phospholipid fluid) that prevents the alveoli from drying out, reduces the alveoli surface tension which helps to prevent alveoli wall from collapsing during expiration and facilitate expansion of lung and establishment of respiration in the newborn. The secretion of surfactant begins in the 35th week of fetal life. This explains breathing problem in premature lungs.

**Functions of respiratory bronchioles and alveoli**

1. External respiration; exchange of gases occurs in the respiratory membrane which is a membrane made up of alveoli wall and capillary wall fussed together firmly
2. Breathing; movement of air into and out of the lung.
3. Defense against infection; protective cell within the lung tissues include the lymphocytes and plasma cells which produces antibodies and phagocytes.
4. Warming and humidifying of air continues as in the upper air airway.

**PHYSIOLOGY OF BREATHING**

Breathing is the exchange of gases between the alveoli and the capillaries.

**External** **respiration**: - This takes place in the lungs. It is the exchange of gases by diffusion between the alveoli and the alveolar capillary across the respiratory membrane. Each alveoli is surrounded by a network of tiny capillaries. Venous blood from the body tissue contains high levels of carbon dioxide and low level of oxygen. Carbon dioxide diffuses from venous blood down its concentration gradient into the alveoli until equilibrium with alveoli air is achieved.

**Internal** **respiration**: - This takes place in the tissues. It is the exchange of gases by diffusion between blood in the capillaries and body cells. Blood from the lungs is saturated with oxygen, unlike the tissue. This creates concentration gradient between capillaries blood and tissues therefore gaseous exchange takes place. Oxygen diffuses from blood stream through capillary walls into the tissues the same way carbon dioxide diffuses from the cells into extracellular fluids then into the blood stream towards the venous end of the capillaries.

**MUSCLES OF BREATHING**

There are two main muscles of breathing. They include:

1. **Intercostals** **muscles**: - This muscle accounts for 25% of breathing. They are arranged into two layers forming the internal and external intercostals muscles. There are 11 pairs lying between the ribs (occupy the spaces between the ribs). External intercostals muscles are useful in inspiration. They are stimulated to contract by the intercostals nerves. On contraction they extend downwards and forward. This elevates the lower ribs and pushes the sternum outwards. Intercostals muscles are used when expiration becomes active for example during exercise. On contraction they extend downwards and backwards.
2. **Diaphragm**: - it is the most important muscle of breathing which is supplied by phrenic nerves. The diaphragm accounts for about 75% of the breathing. When the diaphragm is stimulated by the phrenic nerves to contract, it increases the size of the chest wall thus expands the lungs by lengthening the thoracic cavity. This helps in inspiration.

**ACCESSORY MUSCLES OF BREATHING**

These muscles are mostly used during straineous breathing; they include:

1. **Abdominal** **muscles**: - Used in active expiration. They pull the rib cage downwards and inwards and pushes the diaphragm upwards squeezing the abdominal content hence increasing the pressure of the thorax.
2. **Scalene** **muscles** **and** **Starnocledomastoid** **muscle**: They are both useful in active inspiration. They increase the expansion of the rib cage.

**CYCLE OF BREATHING**

The average respiratory rate is 16-18breaths/minute.Breathing dependent upon changes in pressure in the thoracic cavity. Lungs and chest wall are elastic structures.Breathing follow the underlying physical principle that increasing the volume of a container decreases pressure inside the container. Air flow from an area of high pressure to an area of low pressure therefore pressure inside the lungs determines the direction of air flow. Each breath consists of three phases namely:

1. **Inspiration**: - This is an active process hence energy is used to contract the muscles. It lasts for about 2 seconds. It involves simultaneous contraction of the external intercostals muscles and the diaphragm to expand the thorax. This increases the intra thoracic volume and decreases intra thoracic pressure. This in turn increases the intra pleural pressure at the base of the lungs.The lung tissue is pulled upwards and outwards with the ribs and down wards with the diaphragm. This expands the lungs and in turn decreases pressure within alveoli and air passages. This draws air into the lungs in an attempt to equalize the atmospheric and alveoli pressure. The negative pressure created in the thoracic cavity aids venous return to the heart and it is called **respiratory pump.**
2. **Expiration**: - This is a passive process which does not require energy. Relaxation of the muscles lasts for about 3 seconds. It involves relaxation of the external intercostal muscles and the diaphragm. Their relaxation results in downward and inward movement of the ribcage. This decreases the volume of the thoracic cavity and therefore increases pressure. In return the volume of the lungs increases because the lungs recoil. This increases pressure in the lungs and expels air from the respiratory tract. The lungs will still contain some air to prevent their incomplete collapse together with the pleura.
3. **Pause**: - After expiration, there is a pause before the next cycle begins. It lasts for about 1-2 seconds.

**INCUBATION** **PERIOD**;Theincubation period for the community acquired pneumonia is 2\_10 days.

**Mode** **of** **Transmission**:Pneumonia is transmitted through the following ways:

1. Inhalation :Microorganisms are suspended in water droplets and sprayed in air with coughing, sneezing and talking especially viral pneumonia. The water droplets remain suspended in the air long enough for water to evaporate leaving a droplet nucleus including microorganisms. When these microorganisms are inhaled they overcome the lung defense mechanisms and the lung becomes inflamed.
2. Circulatory spread: This occurs when pathogens are transmitted through the circulatory system to the lungs from the pre-existing infection from other body parts especially in immunosupressed patients with lung disease for example septicaemia and endocarditis.
3. Aspiration: The transmission is through microorganisms from oropharynx and the gastrointestinal tract gets into the lungs by direct contact especially bacterial pneumonia. This is common in those with disorders of oesophagus, diminished gangle and cough reflex and those on endotracheal or nasogastric tube.

**RISK FACTORS TO PNEUMONIA**

1. Age : The old aged and infants are at high risk of pneumonia due to decline in the immunological system.
2. Alcoholics: Drug abuses and patients with neurologic problems for example impaired gangle or swallowing reflexes are at risk of aspiration pneumonia.
3. Nil per oral status: The patient can be on nasogastric tube or endotracheal tube; here there is depressed cough reflex.
4. Prevalence of underlying disease for example chronic respiratory disease, chronic obstructive pulmonary disease, diabetes, hypertension, cardiac failure or renal failure makes the body’s defense weak.
5. Nutritional deficit: If severe can predispose to pneumonia.
6. Smoking: Destructs the ciliar, mucociliary and macrophages activities.
7. Immunosupression: Has high risk of opportunistic infections due to the compromised immunity.
8. General anaesthesia, sedatives or opioid preparations promote respiratory depression.
9. Prolonged immobility and shallow breathing patterns: This leads to atelectasis hence complicating pneumonia.
10. Sometimes antibiotics can lead to pneumonia especially in the very sick patients whereby oropharynx is relatively likely to be colonized by gram negative bacteria.

**CLASSIFICATION** **OF** **PNEUMONIA**

1. Causal agent- Is the most common and relevant classification of pneumonia. It can be: Bacterial pneumonia caused by bacteria, viral pneumonia caused by virus and fungal pneumonia caused by fungi.
2. Clinical presentation\_ can be a typical or typical; a typical pneumonia is whereby there is a gradual insidious onset of symptoms that are not very specific to pneumonia i.e headache, sorethroat, muscle soreness, dry cough and fatigue. Whereas typical pneumonia there is classical manifestation of pneumonia i.e abrupt onset of fever, shaking chills, productive cough and chest pains.
3. According to anatomical location: They include; Lobular pneumonia which refers to patchy consolidation of the lung which may be limited to one lobe but generally includes both the lungs or more than one lobe. The other one is lobar pneumonia which refers to the infection of the entire lobe or a major portion of the lobe.
4. According to the place of acquisition: Are hospital acquired pneumonia this occurs in hospital setup whereby the onset of pneumonia symptoms occurs after 48 hours of hospital admission. It is mostly caused by *Staphylococcus* *aureas*, *Pseudomonas* *aeruginosa* and *Klebsiella* *pneumonia*. The other one is community acquired pneumonia; this occurs within the community setting or within 48 hours of admission, is mostly caused by *Streptococcus* *pneumonia*.

**ETIOLOGY**

Pneumonia results from interaction between the pathogens and host. This occurs when the respiratory system is exposed infectious organisms i.e viruses, bacteria and fungi. The most common are *Streptococcal pneumonia* which is the most common cause of bacterial pneumonia in children.

*Hemophilus influenza type B;* the second most common cause of bacterial pneumonia, respiratory syncytical virus is the most viral cause of pneumonia.

In infants infected with HIV/AIDs ,*pneumocystis* *jiroveci* is one of the commonest cause of pneumonia , responsible for about a quarter of HIV infected infants.

Fungal pneumonia; the most common is *Histoplasma* *capsulatum* which causes histoplasmosis.

**EPIDEMIOLOGY**

Pneumonia is an inflammatory condition of the lungs. Pneumonia is a worldwide public health problem affecting mostly the under five years more so in the developing countries hence closely associated with poverty, malnutrition, substandard housing and inadequate health care. Mortality and morbidity rates continue to rise as a result as the rate accounts for more than 2 million deaths per year.

In developed countries, the mortality rate is low less than 1 per 1000 per year. In Kenya on average day 1 in 12 children suffer from pneumonia. According to the available data from Bill and Melinda Foundation, pneumonia kills 30,000 children every year and many more are left with permanent disabilities despite the launch of pneumonia vaccine.

**PATHOPHYSIOLOGY**

Pneumonia generally refers to the inflammation of the lung parenchyma and is associated with the production of exudates. When the bacteria causing pneumonia enters into the lung with inhalation, aspiration or through circulatory spread, they reach the lungs through the blood stream if other parts of the body are infected .Often the bacteria lives in the upper respiratory tract and is constantly being inhaled into the alveoli, once in the alveoli the bacteria travels into the space between the cells and also between the adjacent alveoli through connecting pores .This triggers an inflammatory reaction sending the white blood cells and neutrophils which are responsible to attack the pathogens invading the lungs .The neutrophils engulf and kills microorganisms but they also release cytokines which results in the general activation of the immune system thus resulting to fever, fatigue and chills. The neutrophils,bacteria and fluid leaked from the surrounding blood vessels fill the alveoli and results to impaired oxygen transportation by causing edema which results to decreased alveoli oxygen tension thus the venous blood passing through the infected air spaces are under ventilated, the blood then returns to the heart poorly oxygenated due to arteio-venous shunting hence leading to arterial hypoxaemia.

**CLINICAL MANIFESTATION**

**Key signs and symptoms include:**

1. Shortness of breath especially when patient is reclining.
2. Tachypnea (25 to 45 breaths in a minute).
3. Chest pains especially when breathing or coughing
4. Cough which can be productive
5. Fevers (38.5-42.8 degrees celcius)
6. Dyspnea- difficulty in breathing
7. Weak pulse, lethargic or confused.

**COMPLICATIONS**

1. Respiratory failure and shock: - hypotension and shock occur mostly in gram negative bacteria disease in elderly patients. It can also result when the infecting organism is resistant to therapy and when disease complicates the pneumonia. Congestive heart failure, cardiac dysrythmias, pericarditis and myocarditis also are complications of pneumonia which may lead to shock.
2. Empyema and pleural effusion-Pneumonia is the buildup of fluid caused infection in the lungs.When the infection sets in, fluid begins to buildup between the membranes that cover the lungs and the chest wall hence causing the pleura to become inflamed.
3. Bacteremia-This happens when the pneumonia is bacteria in nature.The bacteria spreads to the blood hence leading to further complications.
4. Pneumothorax- Occurs when air from the inside the lungs leak into the pleura space between the chest wall and the lungs.

**PREVENTION AND CONTROL**

1. Vacination with *haemophilus* *influenza* *type* *B*/ *pneumococcal* vaccines at 6, 10 and 14 weeks to children under the age of five years.
2. Practice of hygiene; for example hand washing with clean water and soap.
3. Stoppage of smoking
4. Early screening and prompt treatment of the respiratory illnesses.
5. Health education to include early detection, medical adherence and predisposing factors.
6. Offering proper ventilation in homes, houses, hospitals, and discouraging overcrowding. This will reduce the microorganism causing pneumonia available in the air we breathe in.
7. Exclusive breastfeeding for six months

**INVESTIGATIONS**

**31/3/14**

**Test: 1.** Full haemogram

Purpose: Routine for admission.

Fluid: Blood serum.

**Parameter Result Normal ranges**

White blood cells 16.2 k/ul ( high) 4.8 – 10.8

Red blood cell count 5.08 m/ul 4.2 – 6.10

Neutrophils% 54.1% 42.0-75.25%

Lymphocytes% 46.2% 20.0-51.1%

Haemoglobin level 14.9 g/dl 12.0 – 18.0

Elevated white blood cell count indicates presences of an infection.

**Test: 2*.***Malaria Parasite test.

Purpose: - Confirm malaria infection due to raised temperatures.

Findings: - There was no malaria parasite detected.

**Test** **3**: chest X-ray

**Result**; size and shape of the heart was normal

There is left lobar pneumonia

**Conclusion**: Left lobar pneumonia

**MANAGEMENT**

**MEDICAL MANAGEMENT FROM ADMISSION TO DISCHARGE**

The patient was put on intravenous fluid Ringers lactate 200 mls in one hour of admission to help to restore fluids and electrolytes.

Antibiotics were given that is intravenous Benzy penicillin 250,000 international unit and Gentamycin dosage of 15mg to help clear the microganisms.

Oxygen was given at 0.5 to 1liters per minutes until there was improvement in breathing.

Paracetamol syrup 2.5mls three times a day.

**PHARMACOLOGICAL MANAGEMENT**

1. **Per oral paracetamol 2.5 mls three times a day**

**Classification;** - It is a non opioid analgesic (a week cyclo- oxygenese enzyme 1 and 2 inhibitor). It is also an antipyretic drug.

**Mode of action:** - they work by inhibiting the prostaglandins which are responsible for inflammation reaction. Some inhibit the cyclo – oxygenase enzyme which facilitates the production of prostaglandins. They act as antipyretics by acting directly on the hypothalamic heat-regulating center to cause vasodilatation and sweating which helps in reducing heat.

**Indication:** - Analgesic/antipyretic in patients with Aspirin allergy, hemostatic disturbances, upper gastro intestinal disease, biliary tract and genital urinary organs and is also being used in common cold/flu/other viral and bacterial infections with pain and fever.

**Contraindication:** - Any patient with allergy to acetaminophen, prostate enlargement, paralytic ileus and high ambient temperatures.

**Side effects:** - In the central nervous system, it can cause headache if there is an overdose. In Cardiovascular it can cause chest pains, dyspnea. In the gastro intestinal it can cause hepatic toxicity and failure, jaundice. It can also cause hypersensitivity rash on the skin.

**Nursing considerations:** - Consider the five rights of the patient (Right patient, Right drug, Right dosage, Right route and at the Right time). Give the drug with meals if there is gastro intestinal upset. Discontinue the drug if hypersensitivity occurs. Report if there is a change in the color of the skin, eyes, stool and urine (it may be a sign of jaundice). Always give the drug cautiously if the patient is pregnant or lactating (it can cross the placenta and enters the breast milk).

**Dosage:** Adult: 1 gram three times a day. Pediatrics: below 3 years a maximum of 250mg and above 3 years up to 11 year give a maximum of 500mg three times a day.

1. **Intravenous benzyl penicillin 250,000 i.u four times a day**

**Classification;** - Also known as X-pen and they are classified as a cell wall synthesis inhibitors antibiotic.

**Mode of action:** - they work by inhibiting the synthesis of cell wall of sensitive organism hence bacteriastatic and bacteriacidial in high dosage.

**Indication:** - severe infections caused by organisms like *Streptococcal species*, upper respiratory infections caused by sensitive *Streptococci species*, treatment of syphilis, neurosyphilis, congenital syphilis, prophylaxis for rheumatic fever and chorea, anthrax diphtheria and gas gangrene.

**Contraindication:** - Any patient with allergy to penicillin and cephalosporines.

Use cautiously in patients with impaired renal function, pregnancy and lactation.

**Side effects:** - In the central nervous system it can cause lethargy, hallucinations and seizures. In the gastro intestinal it can cause stomatitis, gastritis, sore mouth, nausea/vomiting and bloody diarrhea. Hematological it may cause aneamia, thrombocytopenia and leucopenia. It also causes urticaria, fever and joint pains.

**Nursing considerations:** - Consider the five rights for drug administration (Right patient, Right drug, Right dosage, Right route and at the Right time). Give the drug with meals if there is gastro intestinal upset. Discontinue the drug if hypersensitivity occurs. Always give the drug cautiously if the patient is pregnant or lactating (it can cross the placenta and enters the breast milk). Don’t take any sample for culture after administering the drug.

**Dosage:** Adult 2.4 – 4.8 g in a day in 4 divided doses with higher doses in severe infection. Neonates(1-4 weeks) 75mg/kg daily in 3 divided doses. Child (1 month – 12 years) 100mg/kg daily in 4 divided doses.

1. **Intravenous gentamicin 15mgs once a day**

**Classification;** - Antibiotic in the class of aminoglycosides

**Mode of action:** - they work by inhibiting protein synthesis in the susceptible strains of gram – negative bacteria. It appears to disrupt functional integrity of bacteria cell membrane causing cell death.

**Indication:** - serious infections caused by susceptible strains of *Pseudomonas aureginosa*, *Proteus species, Escherichia coli, Klebsiella* and *Staphylococcus species.* Serious infections if the causative organisms are not known in conjunction with penicillin or cephalosporins.

**Contraindication:** - Any patient with allergy to any aminoglycosides.

Use cautiously in patients with renal and hepatic diseases or pre existing hearing loss.

**Side effects:** - In the central nervous system, it can cause ototoxicity (tinnitus, dizziness, vertigo, deafness, and vestibular paralysis), depression, lethargy and neuroseizures.

They can also cause nephrotoxicity since it is eliminated via kidney, thrombocytopenia, dermatitis and super infections.

**Nursing considerations:** - Consider the five rights for drug administration (Right patient, Right drug, Right dosage, Right route and at the Right time). Assess for allergy to any other aminoglycosides, renal, hepatic diseases or any pre existing hearing loss before administration.Asses for long term therapies, because they may cause toxicity in long term usage. Clean the area before application of dermatological preparation. Ensure adequate hydration of patients before and during therapy. Monitor renal function test.

**Dosage:** Adult: 3-5mg/kg daily in divided doses every 8 hourly, child: 3mg/kg every 12 hours.

ON DISCHARGE: the child was discharged on paracetamol syrup (2.5mls three times a day) and per oral amoxylcillin 125mg three times a day for five days.

**Per oral amoxylcillin 125mg three times a day**

**Indication:** Susceptible non beta lactamase producing bacterial infections

**Mode** **s** **action**: Inhibits the synthesis of the cell wall of sensitive microorganism hence bacterialcidial.

**Precaution**: Renal and hepatic impairment

**Contraindications**: Penicillin/cephalosporin allergy and lymphatic edema.

**Side** **effects**: Anaphylactic reaction, skin rashes and gastrointestinal disturbances.

**Drug** **interaction**: Oral contraceptives, increased digoxin levels.

**Nursing** **considerations**: Determine if the patient has had hypersensitivity reactions previously and closely monitor diarrhoea to rule out pseudo membranous colitis.

**NURSING MANAGEMENT**

**Specific nursing management**

1. Administration of oxygen as prescribed and monitoring the effectiveness not forgetting monitoring of vital signs every four hours to detect abnormal vitals.
2. Teach and encourage the mother to position the patient constantly in a semi fowlers position in order to promote breathing.
3. Advice the mother on the need for reduced activity in order to help in reducing oxygen demand by the tissues.
4. Encourage the mother to breastfeed the baby frequently.
5. Take the patient’s sputum for culture and sensitivity.
6. Advice the mother on importance chest physiotherapy in helping to clear the sputum and making the airway patent.

**General nursing management**

1. Assist in administration of prescribed drugs considering the five rights of the patient.
2. Monitor and document vital signs every 4hourly in order to detect any changes in the parameters.
3. Educating the mother on the importance of exclusive breastfeeding.
4. Educating the mother on the importance of drug compliance and also on the routine follow ups.

**KIAMBU DISTRICT HOSPITAL**

**NURSING CARE PLAN**

**NAME:** M.A **IP NO.** 289719 **DIAGNOSIS:** SEVERE PNEUMONIA.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DATE& TIME** | **CLUSTER OF CUES** | **NURSING DIAGNOSIS** | **OBJECTIVE** | **INTERVENTION** | **SCIENTIFIC RATIONALE** | **IMPLEMENTATION** | **EVALUATION** | **SIGN** |
| 3/4/014  9:00 am | On observation the baby has difficulty in breathing, has chest in drawing and has a respiration rate of 46 breaths per minute. | Ineffective breathing pattern related to lungs infection as evidenced labored breathing, tachypnea at 46breaths/min and chest indrawing. | By the end of twenty four hours patient will be breath at ease. | Administer oxygen 1litre/minute,  mother to nurse the baby in semi fowlers position and  monitor vital signs after every 2 hours. | Oxygen will promote tissue and cell perfusion.  Semi fowlers position will expand the lung capacity allowing maximum entry of oxygen to the lung tissues.  Monitoring of vitals helps in early dictation of abnormal vital signs hence early intervention is taken. | Nurse Gachoka administered oxygen 1litre/minute at 9:30am,  She taught and observed the mother position the patient in semi fowlers position. Student Phebearn monitored vital signs at 10:00am and recorded in the TPR chart. | The baby has shown significant improvement and the process of monitoring the vitals and implementation is still on going | PA |
| 3/4/014  9:00 am | Temperature of 40.9 degrees celcius  Hotness of body on touch  Sweating and shaking chills. | Hyperthermia related to inflammatory reaction caused by the body defense mechanism as manifested by thermometer reading of 40.9 degree celcius, hotness of body, sweating and shaking chills. | By the end of 45 minutes patients temperature will have reduced within the normal range ( 36.2\_37.2 degree celcius). | Expose the child  Advice the mother to give a lot of oral fluids to the child  Administer per oral paracetamol 2.5mls three times a day. | Exposing the child will enhance loss of heat from the body by conduction and radiation.  Rehydration helps to replace the lost fluid in the body.  Paracetamol acts on the hypothalamus to produce antipyresis. | Student Phebearn exposed the child at 10:25am  Mother gave the child fluid per oral at 11am and nurse Gachoka administered paracetamol per oral 5 mls | At 11:30am the temperature was taken and it was 38.5 degrees celcius. This shows significant improvement. | PA |
| 3/4/014  9:00 am | Mother reports that the baby is not able to breastfeed.  Child’s weight 5.8kgs from 6.2kgs | Imbalanced nutrition less than body requirement related to loss of appetite as evidenced by weight loss. | The child to maintain optimum nutritional level of 6.2kgs as per the child’s age. | Weighing the child every day  Encourage the mother to try and breastfeed the child always  Administer multivitamin to the child as prescribed | Weighing helps to monitor the child’s weight  This will help to improve the appetite  Multivitamin provides nutrients required in the body and also boosts appetite | Nurse Grace weighed the child at 2:10pm  Multivitamin administered by nurse Gachoka at 3:30pm. | The child was able to breast feed and retained.  Weighing is still on going. | PA |
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**1st LESSON PLAN WHEN IN THE WARD**

BROAD AREA: PNEUMONIA

SPECIFIC AREA: MODES OF TRANSMISSION, SIGNS AND SYMPTOMS , PREVENTION AND CONTROL

DATE: 3RD APRIL2014

TIME: 40 MINUTES

MAIN OBJECTIVE: Mothers to be able to understand pneumonia and ways to prevent it.

AUDIENCE: PATIENT’S MOTHER AND MOTHERS IN ROOM FIVE

TEACHER: PHEBEARN A. OCHIEL

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| --- | --- | --- | --- | --- | --- | --- |
| **Time** | **Specific objective** | **Content** | **Teacher Activity** | **Teaching Material** | **Student Activity** | **Evaluation** |
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|  |  |  |  |  |  |  |
| 10min | At the end of the session the audience should be able to know various modes of transmission of pneumonia. | Pneumonia is transmitted through inhalation, aspiration and circulatory spread | Explanation and discussion | Lecture Notes  Pen  Flip charts | Listening, taking notes and asking questions. | The audience were able to list various modes of transmission. |
| 20min | At the end of this session the audience should be able to know the sign and symptoms of Pneumonia. | There is fever of 38.50c to 42.80c, difficulty in breathing and chest pains, chest indrawing, coughs and loss appetite . | Lecturing, explanation and discussion | Lecture Notes  Picture chats  Books  Pen and  Paper | Listening, viewing of the chart, taking notes and asking question | The audience were able to identify the signs and symptoms of pneumonia. |
| 10min | At the end of this session the audience should be able to know various ways of preventing and controlling pneumonia. | Prevention is through vaccination of under 5 years at 6, 10 and 14 weeks after birth, provision of good nutritional diet, hygine and ceasation of smoking.  Control is through Prompt treatment and medical adherance | Lecturing ,asking /answering question, explanation then discussion | Listening, taking notes and asking questions | Lecture notes  Book  Pen  Papers | The audience were able to name various ways of controlling and preventing pneumonia. |

**2nd LESSON PLAN ON DISCHARGE**

BROAD AREA: DRUGS AND NUTRITION

SPECIFIC AREA: NUTRITION AND MEDICAL ADHERENCE

DATE: 7th APRIL 2014

TIME: 30 MINUTES

MAIN OBJECTIVE: To be able to understand the importance of medication adherence and nutritional support in disease management

AUDIENCE: PATIENT’S MOTHER

TEACHER: PHEBEARN A. OCHIEL

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| **TIME** | **SPECIFIC OBJECTIVE** | **CONTENT** | **TEACHER ACTIVITY** | **TEACHING MATERIAL** | **STUDENT ACTIVITY** | **EVALUATION** |
| 15min | At the end of this session the audience should be able to understand the need of drug adherence and compliance | Avoid the body developing resistance, the medicine to be able to meet its targeted objective within the period estimate. | Explanation, asking /answering questions, and discussion | Lecture notes  Book  Pen  Papers | Listening and asking questions | The audience was able to understand the frequency and duration of drugs given on discharge. |
| 15min | At the end of this session the audience should to know the importance of taking a balanced diet. | To boost immunity, for body building and repairs and for proper functioning of the other body system in order to achieve the desired metabolic goals | Lecturing asking /answering, and discussion | Lecture notes  Pen  Papers  Books | Taking notes while listening. Asking questions. | The audience was able to share various meal combinations that constituted to a balance diet. |

**3RD LESSON PLAN ON FOLLOW UP CARE, WHEN THE PATIENT CAME DURING RETURN DATE.**

BROAD AREA: IMPORTANCE OF FOLLOW UP CARE

TIME: 20 MINUTES

MAIN OBJECTIVE: To educate on the importance of coming for the follow up and its benefits.

AUDIENCE: PATIENT’S MOTHER

TEACHER: PHEBEARN A. OCHIEL

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| **TIME** | **SPECIFIC OBJECTIVE** | **CONTENT** | **TEACHER ACTIVITY** | **TEACHING MATERIAL** | **STUDENT ACTIVITY** | **EVALUATION** |
| 20min | At the end of this session the audience should be able to understand and appreciate the need to attend follow up clinics | To be able to monitor the progress of the baby and the mother also benefits from knowing and understanding the new method of treatment in the medical field. Any of her concerns can be addressed promptly and on time. | Lecturing and discussion | Lecture notes  Books  Pen  Paper | Listening, taking notes and asking questions. | Ask if they are experiencing any difficulty in making it to the various follow up clinics. |

**FOLLOW UP**

The child was discharged and given a return date on 16th April, 2014.I made a phone call on 14th /4/2014, it was on Monday at around 11:38am I greeted her and asked how they were doing at home and how the baby was doing too. She then told me that they were fine and the child was doing well and she is continuing with giving him his medications. She reported that she has not noted any episodes of hotness of the body and the child is breastfeeding well and also plays a lot.

**EVALUATION**

The case study was generally successful in that the mother of the child was cooperative and she was ready and willing to give me the information I required to write this case study. The nurses in the paediatric ward also helped me with the relevant information I needed.

**CONCLUSION** **AND** **SUMMARY**

This case study has helped me to learn more about pneumonia which is the inflammation of the lung parenchyma and can lead to serious complications. I therefore conclude that all mothers should be educated about the various ways of managing and preventing pneumonia, especially the need for vaccinating the children under 5 years of age with the pneumococcal vaccine, and the importance of child welfare clinic (CWC) until the child is 5 years old for the clinics are useful and helps to detect any problems earlier.

**RECOMMENDATION**

The case study gave me an opportunity to learn more about causes, management, prevention and control of pneumonia as a condition.

More time should be given to students to do a thorough care study since it entails typing and printing.

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