

- this vaccine to freeze damage. the number of doses five doses , the month of a single dose of ,5 ml.
- intramuscular dose is given to the female of child bearing age at the first does given to the female of unit and give the holder after the completion of the third month of pregnancy, this does are not given any protection.
- the second dose give at least one month after the first dose, it give immunity for three years .
- the third dose is given at least six month after the second does this give protection for five years, fourth dose given at least year after the third dose this gives protection for ten years . fifth dose given at least a years after the fourth dose these give lifelong immunity.

Pneumococcal vaccine :

- pneumococcal vaccine PCV13 associated with vaccine that make the annexation of two chemical (protein many sugars) this vaccine protect 13 of serious type of pneumococcal bacteria responsible for more prevalent pneumococcal, the vaccine does not need to prepare .
- saves the vaccine refrigerator in (2-8)c° – volume per dose of 0.5ml.

Pertussis Vaccine:

- does is 0.5 ml and route IM (intramuscular). it should be stored at 2-8 degree Celsius:
- the standard schedule is three dose at 6,10 and 14 weeks and two Boosters at 15-18 month and 5 years followed by boosters every 10 years with either TT or Tdap.
- Stores as refrigerated between 2c° and 8c° (36f° and 46f°) .
- Do not freeze vaccine or expose to freezing temperature .
- Store in original packaging.

Diphtheria Vaccine:

- Is a vaccine used against diphtheria bacterium diphtheria, the agent that causes diphtheria. the initial dose are recommended after which it is

about 15% effective .immunization may start at six week of age with further dose given every four weeks.

- The diphtheria vaccine is delivered in several combinations, one includes tetanus toxoid known as (DT) and another comes with the tetanus and pertussis vaccine known as (DPT) vaccine.
- Diphtheria vaccine is given as intramuscular injection, primary immunization consists of three doses at intervals of (4-6) weeks. Starting at (6) weeks of life the dose is (0.5) ml intramuscular (IM) in the deltoid muscle. the needle size (22-25g, 1-1½).
- First booster is given at (18) months and a second booster at (4-5) years .
- Diphtheria vaccine is very safe. significant side effects are rare .pain may occur at the site of injection that lasts a few weeks.
- The vaccine side effect also may be a lump from at site of injection. it is safe in both pregnancy and among those who have poor immune functions.
- Store diphtheria vaccine refrigerated between 2°C and 8°C (36°C and 96°C) the vaccine don't freeze or expose to freezing temperatures or handle improperly store the vaccine at the appropriate temperature.

Influenza vaccine (seasonal):

- (minimum age – 6 months for trivalent inactivated influenza vaccine (TIV). 2 years for live. attenuated influenza vaccine (LAIV).
- Administer annually to children aged 6 months through 18 years.
- For healthy children aged 2 through 6 years (i.e, those who do not have underlying medical conditions that predispose them to influenza complications either LAIV or TIV may be used, except LAIV should not be given to children aged 2 through 4 years who have had wheezing in the past 12 months .
- Children receiving TIV should receive 0.25 ml if aged 6 through 35 months or 0.5 ml if aged 3 years or older.

- Administer 2 dose (separated by at least 4 week) to children aged younger than 9 years who are receiving influenza vaccine for the first time during the previous influenza season but only received 1 dose. [4]

2.6 Recommended storage temperature:

The majority of commonly recommended vaccine require storage temperature of 35-46°F (2-8°C) and must be exposed to freezing temperature – only variable vaccine must be stored in continuously frozen state (-15°C) with no freeze – thaw cycles .

Freezing temperature can irreversibly reduce the potency of vaccine require to be stored at 35 – 46° f (2-8°C). certain freeze sensitive vaccine contain an aluminum Adjuvant that precipitate when exposed to freezing temperature. this result in loss of the adjuvant effect and vaccine potency. it is recommended that vaccination centers stores only 4 weeks require of all vaccines.

2.7 Vaccine storage requirements:

The refrigerator and freezer compartment should each have separate door. vaccine should not be stored near the cold air outlet from the freezer to the refrigerator. No vaccine should be kept in freezer compartment (except varicella), chiller tray or in topmost shelf of refrigerator. DPT, DT, TT, the second shelf, the used vaccine may be proper labeling door of the refrigerator should not be used for storage of vaccine. Vaccine should not in closed boxes. the lids of all the boxes contrary vaccine should be removed for fine circulation of air around the vaccine vials. Air gaps should also be left between the packet to allow circulation of cold air to help keep all the packets at constant temperature bottle filled with water should be kept in all other areas to maintain temperature for few hours in case of failure electricity repack filled with water kept in freezer compartment also help in mainly temperature in case of electricity failure . A morning and evening temperature record measured by dial thermometer should be maintained.

2.8 Guideline for cold chain :

Most of the vaccine retain their potency in a temperature range 0-8°C, they lose potency if exposed to higher temperature. The potency of vaccine is universally proportional to the duration of its exposure to higher temperature. Cold chain is a system of transporting, storage and distribution of vaccine in a potent state at recommended temperature from manufacture to the point of use. This also includes storage of vaccine at vaccination center and maintains of temperature of vaccine vial during vaccine action session at individual center. The success of efforts against vaccine preventable disease is attributable in part to proper storage and handling of vaccine exposure. Vaccination to temperature outside the recommended ranges can effect potency adversely, thereby reducing protection from vaccine preventable diseases.

2.9 Storage and handling plans:

Every facility should have detailed written protocols for routine and emergency vaccine storage and handling and should be updated annually. These policies and all staff members and easily accessible.

Every facility should also have an emergency vaccine retrieval and storage plan. The plan should identify a back – up location where the vaccine can be stored. Considerations when choosing when choosing this site include appropriate storage units temperature monitoring capability and a back – up generator that can mainsail power to the vaccine storage unit. Potential back-up locations might include a local hospital pharmacy, long – term care facility or the red cross.

2.10 Freezer and refrigerators:

- Stand – alone units that freeze or refrigerate .
- Can vary in size from compact counter – top under the counter to large pharmaceutical grade.
- Maintain required temperature better than combination units particularly the freezer section of these units .

- Only use refrigerator for vaccine storage.
- Use a standalone freezer for frozen vaccines.
- Applies to both temporary and long – term storage maintain required temperature range throughout year.
- If stand – alone freezer is manual defrost regularly and have another storage unit that maintains appropriate temperature for temporary storage unit that maintains appropriate temperature for temporary storage during defrosting .
- Frost – free or automatic defrost cycle may be preferred.

2.11 Storage unit placement:

- Promote good air circulator around storage unit.
- Place in well – ventilated room.
- Allow for space on all sides and top.
- Allow at least 4 inches between storage unit and a wall.
- Don't block motor cover.
- Ensure unit stands level with at least 1 to 2 inches between bottom of unit and floor. [5]

2.12 Communicable Disease:

Tuberculosis:

Tuberculosis is a chronic infections disease caused by mycobacterium tuberculosis. it's a major public health problem in low economically countries. that most often affect the lungs.

Transmission:

The infection is spread by an open adult tuberculosis patient, who discharges tubercle bacilli in the sputum or nasopharyngeal secretions during bouts of coughing or sneezing. the infected sputum spitted carelessly by open cases of tuberculosis dries up and air . the usual mode of infection is through inhalation of droplets of infected secretions. malnutrition under nourished children are more susceptible to develop tuberculosis and environment children

living in overcrowded with inadequate ventilation and little sun shine are at high risk . The incubation period varies between 4 and 8 weeks .

Poliomyelitis :

Is an acute infectious disease leads to irreversible paralysis caused by poliovirus with three distinct serotypes.

Type 1 is the most frequent cause of paralytic poliomyelitis. Poliomyelitis mainly affects children under 5 years of age.

Transmission:

The virus transmitted by person to person spread mainly through the faecal – oral route or less frequently by a common vehicle for example contaminated water or food and multiplies in the intestine.

The incubation period ranges from 7 to 14 days (range 5-35 days).

Diphtheria:

- Diphtheria is an infectious disease caused by the bacterium *Corynebacterium diphtheriae*, which primarily infects the throat and airways. and produces a toxin affecting other organs.
- **Transmission:** Diphtheria is acquired by contact with a carrier or person with the disease.
- Bacteria are transmitted by airborne, droplet liberated during coughing, sneezing or talking. fomites and may at times serve as transmission of infection carriers.
- Incubation period: the incubation period is (2-5) days.

Tetanus:

- Tetanus is acquired through exposure to the spores of the bacterium *Clostridium tetani* are universally present in the soil.
- It is characterized by generalizing muscle spasm lockjaw and potshot anus.

Transmission: it is Transmitted through the spores of *Clostridium tetani*. spores may survive for months together in soil, dust and dirt the spores may enter the body through a puncture, wound following a burn otitis media elective surgery,

dental surgery, infection child birth, or abortion in the human body the spore transform to produce 2 powerful exotoxins named tetanospasimin and tetanlysia. Incubation period: is varies between one day to several month (3-21) days.

Whooping cough (pertussis):

Is the highly contagious and infectious disease of the respiratory tract by *bordetella pertussis*.

Transmission :

Occur directly via respiratory secretion . bacteria spread by droplets discharged from the nose or throat of an infected person usually in direct contact . pertussis is highly contagious during the first week of illness , with secondary attack rate almost percent in susceptible contacts .

Clinical features :

The incubation period is 7 to 14 days. The disease has three clinical stages.

Prodromal stage it is the most infectious period and last for 7 to 10 days the child cough, cold, running and conjunctivitis. The cough becomes severe and frequent at night. Stage of paroxysmal cough this stage lasts for 2-4 weeks. After the onset of cough the child appears restless and dazed and sweats profusely. Triggers of cough are precipitated by food, cold air and cold liquid .

Measles:

Viral disease is the leading killer among vaccine preventable disease . infection is transmitted by droplet spread from the secretion of the nose throat usually 4 days before and five days after the appearance of rash the disease is more common in under . five children in spring month .

Clinical features :

Incubation period is 8-12 days. the illness starts with fever, cold and cough . rash appears on the third day of fever as reddish patches first behind the ears and on face . gradually it spreads downwards to chest.

Abdomen and lags within next days. Thereafter, the macula popular rash starts disappearing in the same order in which it appeared. The whole illness usually lasts for a week .

The disuse is more is sever in undernourished children.

Meningitis bacteria:

Bacterial meningitis is very serious and each be deadly death can cur in as little as a few hours. most people recover form meningitis. However permanent disabilities (such as brain damage , hearing loss and learning loss and learning disabilities) can result from the infection. there are severd types of bacteria that can cause meningitis . leading causes in the united states include .

- Streptococcus pneumonia .
- Group B streptococcus .
- Neisseria meningitides .
- Homophiles influenza .
- Listeria monocytogenes.

Oh average, bacterial meningitis caused about 4,100 cases and 500death in the united states each year between 2003 and 2007 .

How it spread :

Generally the gurus that cause bacterial meningitis spread from one person to another . certain grins . such as listeria monocytogenes can spread through food . How people spread the germs often depends on the type of bacteria it is also important to know that people can carry these bacteria in or on their belies without being sick. These people are (carriers) most carriers never become sick, but can still spread the bacteria to others. here are some of the most common examples of how people spread each type of bacteria each other:

- Mothers can pass group B streptococcus and Escherichia coli to their babies during labor and birth .
- People spread streptococcus pneumonia by coughing or sneezing while in close contact with others, who breathe in the bacteria .

- People spread *Neisseria meningitis* by sharing respiratory or throat secretions (saliva or spit) . this typically occurs during close (coughing or kissing) or lengthy (living the same house hold) contact.
- People can get *Escherichia coli* by eating food prepared by people .

Who did not wash their hands well after using the toilet – people usually get sick from *Escherichia coli* and *listeria monocytogenes* by eating contaminated food .

Transmission :

Fact about bacterial meningitis :

- Meningitis outbreaks often occur in late winter and early spring .
- People with bacterial infections release the bacteria into air on droplet of mucus when they sneeze or cough .
- The bacteria enters the lungs of others when they inhale the droplets .
- Once you have been exposed to the bacteria that cause meningitis it may take 2 to 10 days before symptoms develop.
- People with bacterial meningitis are contagious for a week before they have symptoms .
- Individuals are contagious until they have been treated with antibiotics for at least 24 hours .

Influenza:

Influenza is a contagious respiratory illness caused by the influenza virus . influenza virus are classified into types (A, B, and C) and different strains of each type dominate each year.

The elderly, those with pre- existing medical conditions and pregnant women are at greatest risk of severe influenza, but even healthy people can get severe influenza.

Influenza or ' the flu ' is an acute viral illness that mainly affects the respiratory.

Transmission:

Influenza is spread easily, mainly through large particle droplets generated by squeezing and coughing. 1.2 droplets containing the influenza virus also settle on to surfaces, and can then pass from hands to the nose, mouth or eyes. People with influenza can be infectious to others from the 24 hours before symptoms start until a week after the start of symptoms. In previously healthy individuals, symptoms typically subside within 5-8 days.

People of all ages are susceptible to influenza. The percentage of people in the general community affected by flu each year is typically 5-10% but maybe to 20% in some years. This percentage is higher for children with 10-40% infected each year. Influenza is more easily spread where large numbers of people gather. As such, infection rates may be 2-3 times higher in closed populations (e.g. aged care facilities and households). [6]

Vaccine side effects:

It's natural to be concerned that you or your child will have a side effect after having a vaccination.

While all vaccines have the potential to cause side effects in some people, the reality is that most tend to be mild and don't last longer than a few days. Some people don't get any side effects at all.

2.13 Common vaccine side effects:

Common side effects of any vaccine can include:

- injection site reactions (pain, swelling and redness).
- mild fever.
- Shivering.
- Fatigue.
- headache.
- muscle and joint pain.

Rare vaccine side effects:

A far less common, but serious, vaccine side effect is an immediate allergic reaction, also known as an anaphylactic reaction. These are dramatic and potentially life-threatening. However, they are very rare— occurring in less than one in a million cases – and are completely reversible if treated promptly by healthcare staff. To have a balanced view, potential side effects have to be weighed against the expected benefits of vaccination in preventing the serious complications of disease. Read more about the benefits and risks of vaccination. Not all illnesses that occur after vaccination will be a side effect. Because millions of people every year are vaccinated, it's inevitable that some will go on to develop a coincidental infection or illness shortly afterwards. What to do if your child is unwell after having a vaccination. Most common side effects in babies and young children are at the site of the injection, and include:

- swelling
- redness

A small hard lump these symptoms usually pass within a couple of days and you don't need to do anything about them. Children may sometimes develop a high temperature (fever). If this happens, keep your child cool. Make sure they don't wear too many layers of clothes or blankets and give them plenty of cool drinks. You can also give them a dose of infant paracetamol or ibuprofen liquid according to the instructions on the bottle. [7]

2.14 Role of Registered nurses in vaccinations:

Registered nurses (RNs) and Nurse Practitioners (NPs) play a key role in the administration of vaccines through immunization. Vaccines have a significant positive impact on the health of the population by controlling the spread of vaccine-preventable disease (PHAC, 2015). The safe, effective and ethical administration of immunizations requires specific competencies. This Q & A will address common questions and introduce some considerations for nurses to be aware of prior to providing immunizations.

Q1. What are the responsibilities of an RN regarding the administration of immunizations?

A. In the administration of immunizations, RNs must:

- a) possess the required competencies.
- b) be able to differentiate between personal beliefs around immunization and actual scientific evidence supporting their effectiveness.
- c) have a prescription or a care directive to administer the vaccine.
- d) ensure that the administration of immunizations is within their scope of employment and their agency has the related policies.
- e) take steps to ensure client safety by having a plan in place to manage potential adverse events, (such as anaphylaxis) following immunization. This includes medication management, client monitoring and documentation. Documentation following immunization needs to include the lot number of the vaccine in case of a recall or adverse event. Adverse events must be reported to Public Health. A separate prescription or care directive is required to administer a medication for an adverse/allergic event.
- f) report all cold chain breaks to the local Public Health office. Keep vaccine refrigerated while waiting to receive direction from Public Health on use of affected vaccines.[8]

Chapter Three

Material and Method

3.1 Study design:

Descriptive cross-sectional study done in Atbara Teaching Hospital during the period extend from (5/7/2017- 19/7/2017).

3.2 Study Setting:

The study was conducted in Atbara teaching hospital center of vaccination

3.3 Study Population:

The selected group of the study population is mothers who are in Atbara teaching hospital center of vaccination were chosen randomly to respond to the questionnaire items.

3.4 Sample size:

The seventeen(70) mothers who were chosen to respond to the questionnaire were chosen purposively among the total number of the mothers in Atbara hospital.

3.5 Instrument:

The data of the study was taken from mothers questionnaire. The objectives of to assess the knowledge of mothers and attitude of mothers about routine vaccination.

3.6 Data analysis:

The data was collected by use master sheet then analysis by using simple statistical technique then by using software computer program Statistical Package For Social Sciences (SPSS) determine statistical measured used (frequency, percentage). P-value was consider significance if less than (0.05) then percentage in from of table.

3.7 Study Variable:

- Dependent variable:

Knowledge and attitude of mothers of about routine vaccination.

- Attributing variable:

Demographic data of mothers include age, education, family income .

3.8 Ethical Consideration:

Consent was taken from the mothers to participate in the study, after explanation the purpose of study and data should be confidential.