CHAPTER 2
THEORITICAL BACKGROUND

2.1 Anatomy Physiology of Vertebra

2.1.1 Anatomy

The musculoskeletal system is the support of body shape and plays a role in movement. This system consists of bones, joints, skeletal muscles, tendons, ligaments, bursa and special tissues connecting the structure (Syaifuddin, 2009, in Noor, 2012).

2.1.1.1 Bone

That is a hard connective tissue, whose intersecular substances are harsh, mainly containing many minerals containing adhesives and substance chalk . Bone tissue has functions:

a. Keeping the body up
b. Establishing cavities to store (protect) delicate organs
c. Forming joints and as a place of attachment of ligaments and muscles (Syaifuddin, 2009, in Noor, 2012).

2.1.1.2 Joints

Joints are the encounter of two bones or some bones from the skeleton, these bones are combined in various ways, for example with joint capsules, fibrous bands, tendon ligaments, fascia or muscles.
There are three types of joints. Those are :

a. Fibrosa joint (Throida rays) is a joint that cannot move, for example; bony joints, tibia joints and inferior fibula.

b. Cartiloginous joints (amphiar throida) is a slightly moving joints. For examples : the symphysis pubis joints, the joints of the sterni manubrium and carpus sterni.

c. Sinovial joint (thyroidal diar) is a joint that can move freely. For example: swivel joints (joints of the pelvis and shoulders), joints (hips and hands), hinge joints (elbow and knee joints), pivot joints or swivel joints (ulna, parallel radius and crossed radius) and saddle joints or reciprocal joints wrist joints (Syaifuddin, 2009, in Noor, 2012).

2.1.1.3 Muscle

An organ or device that allows the body to move, this is an important property for the organism, most of the body muscle attached to the skeleton in a particular location. therefore muscle, especially skeletal muscle, is a tool that controls active motion and maintains posture. In a state of rest, the state is not sagging at all but has a slight strain called a tanus. In each organ, it is different depending on age, sex and state of the body. The functions of muscle tone are:

a. To maintain posture and body position.

b. To the abdominal wall muscles are useful to hold the abdominal cavity.

c. To the abdominal wall muscles of blood vessels are useful to withstand blood pressure (Syaifuddin, 2009, in Noor, 2012).

2.1.1.4 The upper limb muscles (the muscles in the thigh), have a very strong wrapping and divided into two groups, those are:

a. Abductor muscle, consisting of:
   1) Musculus abductor must be inside
   2) Musculus abductor brevis middle
   3) Musculus abductor longus outside
b. Extensor muscle (Quadriseps femaris) four-headed muscle. This muscle is the largest muscle, consisting of:
   1. Musculus rectus femoris
   2. Musculus vastus lateralis external
   3. Musculus vastus internal medial
   4. Musculus vastus inter medial

   (Syaifuddin, 2009, in Noor, 2012).

2.1.2 Bone vertebrae of 33 bones: 7 cervical bones, 12 thorac bones, 5 lumbar bones, 5 sacrum bones. The cervical, thoracic and lumbar bones are still distinguished to any age, but the sacral bone and coccinia are joined together to form two bones, the sacred bone and coccinia (Kuntono, 2007, in Rahim,2012).

2.1.3 Vertebra is a column consisting of a number of bones of the same shape, which are interconnected with each other through a number of articulations to form rigid structures, yet retain some degree of flexibility, allowing vertebrae to support posture, protecting the neural elements the work through it , while at the same time allowing functional movement

Vertebra consists of 33 bones, those are :

1. Seven cervical vertebrae
2. Twelve thoracic spines
3. Five lumbar vertebrae
4. Five pieces of unused sacrum vertebrae (fusion)
5. Four pieces of integrated koksigis bones (fusion).

The anatomical vertebra consists of two main components, those are the spongial ventral bone, which is the vertebral corpus with the

cylindrical shape and the posterior structure arranged by the vertebral of the posterior vertebral arch. The vertebral body is connected to the posterior arch by a pair of sturdy pillar structures called pedicles. Each pedcel on the right and left sides of the vertebra corresponds to a pair of flat structures that are curved and fused in the midline called lamina. At the meeting between the laminae on the left and right side, there is a bone protruding into the dorsum called the spinous process. At the meeting between the pedicles with the lamina on each side there is a protrusion of the bone in the lateral direction that forms a pair of transverse processes. Furthermore, between the transverse and lamina processes there is an articular procession that forms the facet joints between one vertebra and the adjacent vertebra, the continuity between the pedicles and the lamina on one side with the opposite side forming a ring-shaped bone structure. The ring of each segment forms a canal that extends from the cervical to the sacral and into the spinal cord in the duramater membrane (Rahim, 2012).

2.1.4 Cervical vertebrae

According to Rahim (2012) the cervical vertebrae is divided into two groups, those are c1-2 which form the axial vertebrae and c3-7 which form the subacial vertebrae. The cervical vertebrae c1-2 has a specificity as it serves to support the skull and allows rotational movement between the carnial and vertebrae called the cervico-cranial junction. Generally, the cervical vertebra has a small, thin realistic body, its transversus diameter is greater than its anterioposterior diameter. The lateral edges on the superior surface of each corpus have a superior protrusion to form a distinctive unsinatus process, in which the spinous procesus has a split, each transverse process has an anterior tubercle in which the anterior cervix is from the muscle and the posterior tubercle. Place of origo

and insertion of the posterior cervical muscle, the transverse foramen penetrating the transverse process into the release of the vertebral nerve roots.

2.1.5 Thorac vertebrae

According to Rahim (2012) twelve thoracic spinal cords support the ribs and have facet joints on each side, the mid-thoracic vertebra body in the center of the column resembles the shape of the heart. The vertebral arch in the thoracic column forms a small spinal canal and has a narrow space. This narrow space is predisposing to trauma in the spinal cord, although structural damage to the vertebral column is not too heavy. The process compares the length of the thoracic and the triangle on the cross section. Proosesus spinosus vertebra T5-8 further indented towards the caundal with an angle of 60^{o} degrees so as to form overlap with the segment underneath.

2.1.6 Lumbar vertebrae

According to Rahim (2012), the lumbar vertebra is located above the sacrum. The dimensions of the lumbar vertebra are larger than the other vertebrae, unlike the cervical and thoracic vertebrae. The lumbar spine has no foramen transverse foramen or faset articularis. In addition, the lumbar spine body is larger and the lateral diameter is much larger than the anteroposterior diameter. The anterior corpus is slightly thicker than the posterior. The thicker pedicle lies in the dorsosuperolateral aspect of the corpus with the lamina formed triangular vertebral foramen.

2.1.7 Sacrum

According to Rahim (2012), the sacrum is a large triangular bone, located at the top and back of the pelvic cavity, bone located between the hip bone, the upper part connected to the last lumbar vertebra and the lower part connected to the coccyx. This bone is made up of five vertebrae that were not originally united and begin

to unite at the age of 16 - 18 years, the general will be completely united into one bone at the age of 34 years.

2.1.8 Coksigis

According to Rahim (2012), coksigis or tail bone, often called the coccyx, is the last segment of the vertebra. This bone is attached to the sacral bone with a combination of fibrokartilaginosa and sacrocoksigis simrokisis that allows limited movement between the sacrum and the coccyx.

2.1.9 Ligaments of the vertebrae

According to Rahim (2012), a vertebra has several ligaments that strengthen its structure, that is the falvum ligament, intertransversus, posterior ludin, antiterary angle, supraspinosus, interspinosus, and facet capsule Ligaments and muscles.

According to Rahim (2012) to strengthen and support spinal tasks to support weight, the spine is strengthened by muscles and ligaments, including Ligaments:

1. Intersegmental ligament (connecting the entire length of the spine from end to end).
   a. Anterior Longitudinal Ligament
   b. Ligament Longitudinalis Posterior
   c. Praspinosum ligament
2. Intrasegmental ligament (Connecting one vertebra to adjacent segment)
   a. Intertransverse Ligament
   b. Ligamentum flavum
   c. Interspinosum Ligament
3. Ligament that strengthens the relationship between the occipital bone with cI vertebrae with c2, and sacroilliaca ligament between the bone of the sacrum and hip bone muscles:
   a. Abdominal wall muscle
   b. Spinalis extensor muscle

c. Gluteus maximus muscle

2.1.10 Vertebrae nerve

According to Rahim (2012), the central nervous system (CNS) includes the brain and spinal cord, both of which are vital organs and need to be protected from trauma. In addition, to vertebral skull and bone, the brain and spinal cord are also protected by 3 layers of meningen membrane, there is inflammation as mengitis. The three layers of the meningen from the inside out are as follows:

a. Durameter, consists of two outermost layers attached to the skull as endostium, while the inner layer is easily removed from the skull, between the bones of the head with the durameter of the epidural.
b. Arachnoid, is so called because it resembles a spider web, where there is a liquid called cerebral spinal liquor (CSL), a type of lymphatic fluid that fills the arachnoid cavity, as a function that protects the brain from mechanics trauma.
c. Piameter is the deepest layer of the brain membrane that forms to adapt the surface of the brain. Although the brain and spinal cord have the same material, but the arrangement is different, in the brain, the gray matter lies in the cortex and the white matter is located in the medulla, whereas in the medullary spine opposite the medulla consists of gray butterflies, while the cortical section is white.

2.1.11 Vertebral dermatomes

According to Rahim (2012), each of the spinal cord will lead to skin dermatomes.

2.1.12 Vertebral articulation

According to Rahim (2012), the articulation of the vertebral arch is a combination of sides, joints formed by the articular processes of each segment, joints that have joint capsules that allow movement of the shift between surfaces to slide, the joint surface area

determines the movement characteristics of each vertebral articulation. In addition to curvature, there is also articulation between vertebral bodies, vertebral bodies one and the other connected by intervertebral discs in the form of fibrocartilago complexes and a pair of facet joints, each of the same intervertebral discs having a nucleus. It consists of an internal semicycle called necleus pulposus and fibrous lamina tissue that surrounds the so-called annulus fibrosus.

2.2 Basic Concept of Spondylitis Tuberculosis

2.2.1 Definition

Tuberculosis spondylitis is an infection of chronic extra pulmonary tuberculosis in the form of granulomatosis infection caused by specific bacteria Mycobacterium tuberculosa that affect vertebral bone so that can cause bone destruction, deformity and paraplegia (Tandiyo, 2010).

Tuberculosis spondylitis is a relationship between the weakness of the lower motion tool with curvature of the spine (Zairin, 2012).
Tuberculosis is an infectious disease caused by mycobacterium tuberculosis infection, this infection can affect almost every organ of the body, including the most commonly infected bones, bones, vertebrae, hips, knees, feet, elbows, and shoulders. About 10% of tuberculosis infections involve bones and joints with 50% of them infecting the vertebra (tuberculosis spondylitis) spondylitis tb having a neurological disorder that potentially causes paraplegia
(Rahim, 2012).

Tuberculosis spondylitis is an infection of Mycobacterium tuberculosis in the spine (Zuwanda & Raka, 2013).

This disease is a form of a destructive disease of tuberculosis (Garg & Somvansi, 2011).

Tuberculous spondylitis is known in several names, that is spinal tuberculosis or tuberculosis, Pott's atat Pott's disease, Pott's paraplegia, Pott's disease of the spine or Pott's disease of the spine. (Garg & Somvansi, 2011).

Spondylitis tuberculosis or spinal tuberculosis is chronic and destructive granulomatous inflammation by Mycobacterium tuberculosis, also known as Pott disease in the spine or vertebral osteomyelitis of tuberculosis. Spondylitis is most commonly found in T7-L3 vertebrae and most rarely in vertebra c1-2. Tuberculous spondylitis usually affects the body of the vertebrae, but rarely attacks the vertebral arch.

2.2.2 Etiology

According to Paramarta (2008) tuberculosis is an infectious disease caused by Mycobacterium tuberculosis which is a member of the Actinomicetales order and the Mycobacteriase family. The tubular bacillus is a curved, weakly gram-positive rod that is difficult to stain but once successfully colored it is difficult to remove even with an acidic substance, so it is referred to as acid-resistant stem germs. This is because the bacteria have a thick cell wall consisting of a layer of wax and fat (micolate fatty acids). In addition it is pleimorphic, immobile and does not form spores and has a length of about 2-4 cm.

2.2.3 Pathophysiology

According to Esteves (2017), the mycobacterium tuberculosis complex bacillus causes tuberculosis , there are 60 species described but only a minority causes disease in humans. The

mycobacterium tuberculosis (which is the most common), the mycobacterium bovis, the mycobacterium microti and the mycobacterium africanum tuberculosis of the spine aare a local manifestation of a systemic disease, It is always secondary to a primary focus on another part of the body, often pulmonary or genito urinary.

According to Esteves (2017) in 80% of cases, tuberculosis is difficult to detect the primary focus. Although, it can also occur by direct dissemination from adjacent structures. Vertebral infection occurs, in the majority of cases, by hematogenous dissemination of the bacillus, both via arterial and venous. Each vertebra is nourished by a rich subchondral arterial plexus that derives from the anterior and posterior vertebral arteries, being associated with the dissemination of the bacillus to the paradiscal areas. The infection of the vertebral body is associated with the intraosseous venous plexus derived from the batson paravertebral venous plexus.

The most common type of ST is the paradiscal that occurs in about 90 to 95% of cases, in which the bacillus infects the anterior part of the vertebral body, adjacent to the subchondral plaque. From this focus, the infection extends to the central part of the body and intervertebral disc, which is spared until late stages of the disease, due to the fact that the mycobacterium tuberculosis lacks proteolytic enzymes.

According to Esteves (2017), the other types (representing 5% to 10%) include: central tuberculosis, in which the disc is not involved, being characterized by the destruction and collapse of the vertebral body with the appearance of vertebra plana , the posterior

type with involvement of the posterior elements, and the non-skeletal type, characterized by the formation of abscesses without complications at the bone level, although in the adult the anterior part of the vertebral body is classically the first to be affected by the infection that extends secondarily to the disc, that in precariously vascularized in this age, in the child.

According to Estaves (2017), the intervertebral discus may be primarily affected once is more vascularized, Spinal Tuberculosis is characterized by kyphotic deformity due to progressive destruction of the intervertebral space and adjacent vertebral bodies, formation of cold abscesses by extension to adjacent ligaments and soft tissues, and neurological deficits due to mechanical compression or direct effect of infection under neural structures , any area of the spine can be affected, however, the lower thoracic region is most frequently affected (40% to 50% of the cases), followed by the lumbar spine (35% to 45%) and the cervical spine (10%).

According to Ghauhan & Gupta (2007), the spinal tuberculosis is a result of haematogenous dissemination from a primary focus in the lungs or the lymph nodes. The central type of vertebral tuberculosis spreads along with Batson's plexus of veins, while paradiscal infection spreads through the arteries. The anterior type of vertebral body tuberculosis results from the extension of the abscess beneath the anterior longitudinal ligament and periosteum. Lower thoracic and lumbar vertebrae are the most common sites of spinal tuberculosis followed by middle thoracic and cervical vertebrae.

2.2.4 Pathway

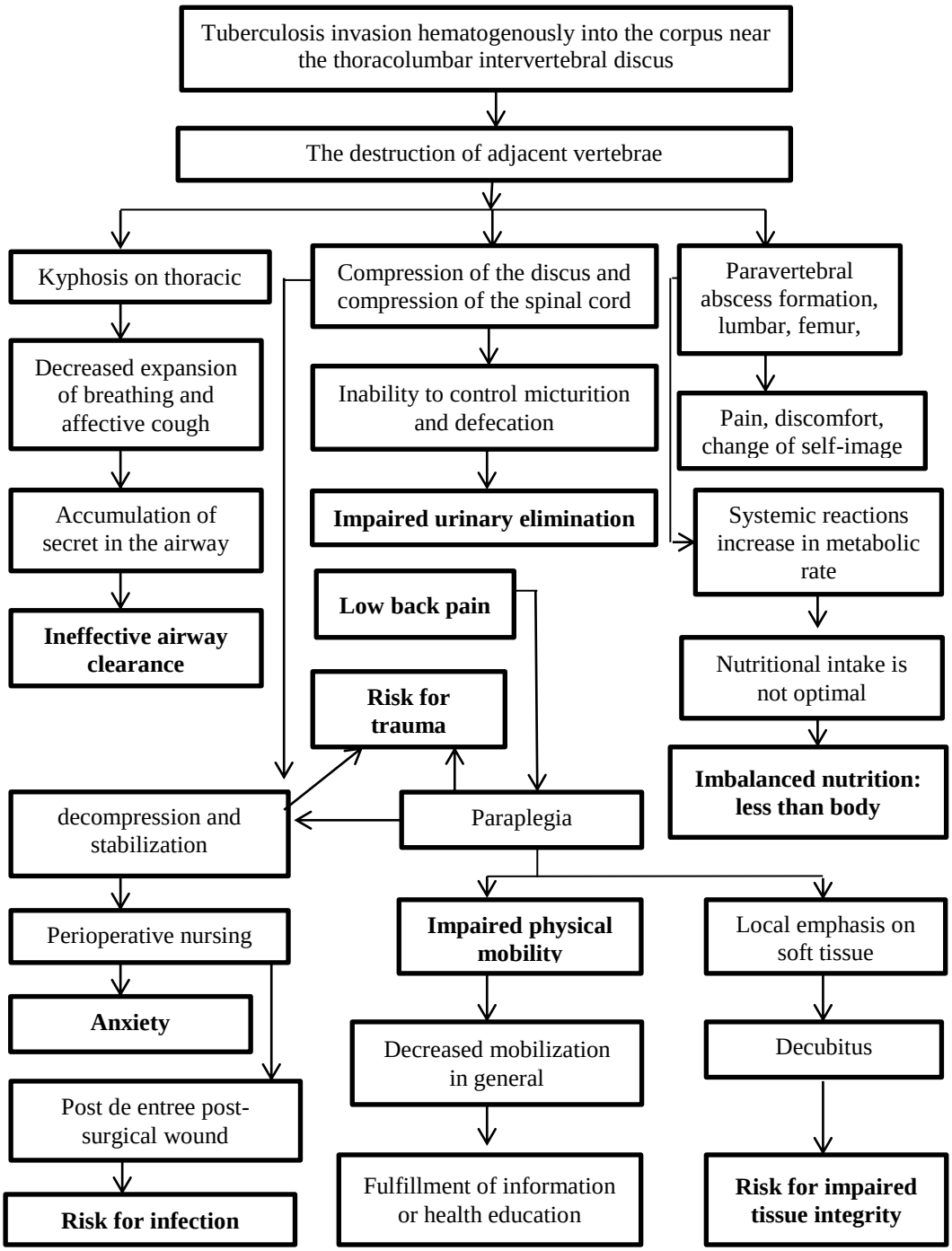

Figure 2.1 pathway

Source : (Mutaqqin, 2013)

2.2.5 Classification

According to Qadeer & Sharif (2015), throughout history multiple classification systems have been used to quantify the degree of deformity and anterior and posterior involvement along with neurological involvement to plan for the best treatment option. Kumar introduced a 4-point classification system based on stage of disease and site of system based on MRI findings and classified in 4 groups, but it lacked to address areas other than dorsal spine. Orguz et al classified TB spine as follows:

- Type I, one-level disc involvement and soft tissue infiltration without abscess, collapse and neurologic deficit.
- Type I-A, lesions only limited to vertebra and therefore, manageable with fine needle biopsy and medical therapy.
- Type I-B, abscess formation exceeds the vertebra and the treatment is debridement using an anterior, posterior or endoscopic approach.
- Type II, one- or two-level disc degeneration, abscess formation and mild kyphosis correctable with an anterior surgery.

2.2.6 Signs and Symptoms

According Maulana (2016), potential constitutional symptoms of pott disease include fever and weight loss. The reported average duration of symptoms at diagnosis is 4 months but can be considerably longer. This is due to the nonspecific presentation of chronic back pain. Back pain is the earliest and most common symptom of Pott disease, with patients usually experiencing this problem for weeks before seeking treatment. The pain caused by Pott disease can be spinal or radicular. Neurologic abnormalities occur in 50% of cases and can include spinal cord compression with paraplegia, paresis, impaired sensation, nerve root pain, or cauda equina syndrome.

2.2.7 Diagnostic Examination

According Maulana (2016), the physical examination in Pott disease should include the following:

- Careful assessment of spinal alignment
- Inspection of skin, with attention to detection of sinuses
- Abdominal evaluation for subcutaneous flank mass
- Meticulous neurologic examination

Although the thoracic and lumbar spinal segments are nearly equally affected in persons with Pott disease, the thoracic spine is frequently reported as the most common site of involvement. Together, these segments make up 80-90% of spinal tuberculosis sites, with the remaining cases of Pott Disease occurring in the cervical spine. Almost all patients with Pott disease have some degree of spine deformity (kyphosis).

According Maulana (2016), examination should reveal local pain related to the affected area or radicular pain. Muscle spasm and rigidity can also be associated. Large, cold abscesses of paraspinal tissues or psoas muscle may protrude under the inguinal ligament and may erode into the perineum or gluteal area. Neurologic deficits may occur early in the course of Pott Disease. Signs of such deficits depend on the level of spinal cord or nerve root compression. Pott Disease that involves the upper cervical spine can cause rapidly progressive symptoms. Retropharyngeal abscesses occur in almost all cases affecting this part of the spine. Neurologic manifestations occur early and range from a single nerve palsy to hemiparesis or quadriplegia. A large proportion of clients with Pott Disease do not present with extraskeletal disease.

In reported series, only 10-38% of cases of Pott Disease are associated with extraskeletal tuberculosis.

2.2.8 Treatment

2.2.8.1 According to Qadeer (2015), treatment is required after confirmation of the diagnosis, if there is controllable pain, with no increasing deformity, and stable neurological deficit, then a trial of conservative management can be given and surgery is nor necessary. In case there is increasing deformity, increasing neurological deficit, on increasing pain, then surgical intervention is required, with debridement and stabilization.

a. Non- Operative Treatment

This involves immobilization till the pain improves or the instability is excluded. Later mobilization is with brace therapy. ATT is continued for a minimum of 9-18 months, depending on the extent of the infection and organism (Qadeer, 2015).

b. Medical Therapy

Medical therapy with anti tuberculous drugs is the corner stone in Pott's spine. The standard drugs consists of Isoniazid (5 mg/kg maximum 300 mg/day), rifampicin 15 mg/kg; maximum 600 mg/day, ethambutol (15 – 25 mg/kg; maximum 2 g/day), pyrazinamide (15 – 30 mg/ kg maximum 2 g/day). Pyridoxine was also added to the regimen prophylactically. This regimen is given for two months followed by withdrawal of pyrazinamide and ethambutol for the rest of the period. The period ranges from 9-18 months , in case of MDR tuberculosis 6 drugs may be required with the duration of up to 18 to 24 months (Qadeer, 2015).

c. Operative Treatment

Surgery may be necessary in about one-eight of the clients. The options include: radical debridement with or without bone grafting, or radical debridement, bone grafting along with instrumentation. Indications for surgical intervention are to obtain diagnosis when closed biopsy is unsafe or is unsuccessful, clinically significant abscess with cord compression, progressive neurological deficits, significant deformity of vertebral body, and in medical refractory cases (i.e. high ESR, persistent pain and progressive neurology). An increasing number of articles indicate that instrumentation is not contraindicated in cases where radical debridement is achieved. The additional stability instead promotes clinical resolution of the infection and related symptoms (Qadeer, 2015).

2.2.8.2 Surgical Treatment

According to Esteves (2017), despite the fact that the mainstay of treatment is medical management, antitubercular drugs alone may not solve all the complications of vertebral infection. In general, indications for surgical treatment include decompression of the spinal cord and neural structures, prevention or correction of kyphotic deformity, prevention or correction of spinal instability, drainage of large cold abscesses, failure of conservative treatment, presence of severe persistent pain or need of sample collection for diagnosis . Surgical techniques have evolved considerably from decompression

and non-instrumented arthrodesis to the use of pedicle screws and anterior reconstruction implants. The work of Oga et al. played a preponderant role in this evolution by demonstrating that Mycobacterium. does not form extensive biofilms. Hence, the use of an implant is considered safe when anti-tubercular chemotherapy regimen is being used. The development of posterior surgical techniques that allow transpedicular or transforaminal decompression and anterior reconstruction have changed the surgical approach of spinal tuberculosis.

2.2.9 Prognosis

With new diagnostic modalities, and proper, medical and appropriate surgical treatment, the disease has a favorable outcome even in the presence of deformity and neurological deficits which are usually reversible up to 75%. Personal series of 350 clients who underwent surgery over 11 years, only 3 clients have remained plegic despite 25 % presenting with plegia Qadeer (2015).

According Kumar (2011), prognosis is generally good in patients without neurological deficit and deformity. Various studies show that 82–95% cases respond to medical treatment alone in the form of pain relief, improving neurological deficit, and correction of spinal deformity, In a recently published study among patients with neurologic deficit, significant recovery occurred in 92%, with 74% improving from nonambulatory to ambulatory status. This study included 82 patients: 52% of patients presented in a nonambulatory state, 21% had mild neurologic deficits, and 27% had intact neurological function. In a study from an endemic country, the majority (79 patients, 61%) of patients had severe motor and sensory impairment. Imaging revealed multiple vertebral

involvements in 90 clients (80%). All patients were managed using antituberculous treatment, however, 33 patients required operative treatment as well. Marked clinical improvement was seen in 91 clients (70%) within 6 months of treatment, in Korea, a retrospective study examined the treatment outcome in patients with spinal tuberculosis. A total of 116 patients with spinal tuberculosis were analyzed. Forty-seven patients (35%) had severe symptoms. Radical surgery was carried out in 84 (62%) clients. Twenty clients were treated with short-term chemotherapy, while 96 underwent long-term antituberculous treatment. At the end of chemotherapy, 94 patients had achieved a favorable status and 22 an unfavorable one. Age and radical surgery were significantly related to a favorable outcome by logistic analysis. clients with craniovertebral junction tuberculosis can be managed conservatively regardless of the extent of bony destruction and the majority have satisfactory outcome. In a retrospective study of 71 clients, 11 clients underwent early surgery. Five (8%) clients required delayed surgery for reducible atlantoaxial dissociation. The remaining 82% patients were effectively managed conservatively.

2.2.10 Complications

According to Jha (2016), post operative cold abscess formation at the operative site 4 weeks after surgery was seen in one patient. It led to chronic pus discharging sinus which gradually healed over a period of 8 weeks **.** Three patients discontinued ATT after 2 months and lost to follow up till they deteriorated again, which may be due to insufficient information provided from our end, lack of awareness, illiteracy and poverty due to which they had to pursue their jobs for their livelihoods

2.3 Basic Concept of Nursing Care Spondylitis

According to Peter & Julia (2012), nursing care is a therapeutic process that involves the cooperative relationship between the nurse with clients, families, or communities to achieve optimal health status in providing nursing care methods which include nursing process: assessment, nursing diagnosis, planning, implementation and evaluation.

2.3.1 Nursing Assessment

2.3.1.1 Anamnesa

According to Peter & Julia (2012), the client's identity includes name, age, sex, occupation, marital status, education, address, date of entry hospital, date of assessment and medical diagnosis. Spondylitis tuberculosis can occur in all ages, with a very young age and elderly have special risks. Back pain is the earliest complaint, often is not specific and makes early diagnosis difficult. Then from That, any pulmonary tuberculosis client with back pain complaints should Suspected of tuberculosis spondylitis before proven otherwise. Paraparesis is a symptom that usually becomes a major complaint that leads clients to seek treatment. Other neurological symptoms Which may be numbness, defective disorders and micturition.

History of current disease according Peter dan Julia (2012), at the beginning can be found radicular pain that surrounds the chest or abdomen. Pain is worse during the night and gain weight especially during spine movements. In additions to the main complaints the client can complain,

decreased appetite, the body feels weak, cold sweat and weight loss.

History of previous disease, about the occurrence of the disease tuberculosis spondylitis is usually on the client preceded by a history of ever suffering from pulmonary tuberculosis or history of classic symptoms (old fever, nocturnal diaphoresis, old cough, weight loss) if pulmonary tuberculosis has not been enforced before.

Family Health History, in clients with tubeculosis disease Spondylitis one the cause of the occurrence is the client has or is still in contact with other sufferers who suffer from tuberculosis or in the family environment there are those infectious diseases.

2.3.1.2 Psychosocial history

According to Noor (2012), the client will feel anxity about his illness, so look sad, with the lack of knowledge about the disease, treatment and treatment then the patient will feel fear and more anxious so that his emotions will become unstable and affect the patient socialization.

2.3.1.3 Physical Examination

According to Noor (2012), there are physical examination, those are :

a. B1 (Breathing)

In the client spondylitis tuberculosis with enzyme phase of the activity severe infections are found in the cough of the client, increased sputum, shortness of breath, use of respiratory muscle, and increased respiratory rate, palpation, right and left tactile fremitus are found, in percussion, resonance is found throughout the lung, in

auscultation, obtained, such as ronkhi on clients with increased production of closed, and decreased cough ability that is often found in clients with spondylitis tubules with decreased levels of consciousness, in clients with early tuberculosis spondylitis there is usually no abnormalities in the respiratory system.

b. B2 (Blood)

In situations of tuberculosis spondylitis with long-standing paraplegia complications, there will usually be orthostatic hypotension (systolic blood pressure <25mmHg and diastolic <10mmHg at work rising from a sitting position). In clients of tuberculosis spondylitis without paraplegia, usually not obtainable abnormalities in the cardiovascular system.

c. B3 (Brain)

Pain varies, mild pain to severe pain (associated with disease process). Usually the client's mental status does not change, but neurologic deficits appear in 10-47% of cases of clients with tuberculosis spondylitis.

d. B4 (bladder)

In tuberculosis spondylitis in the thoracic and cervical areas, there is no abnormality in this system. In lumbar tuberculosis spondylitis, urinary incontinence is common, the inability to communicate the need for urinary elimination.

e. B5 (Intestines)

In clients of tuberculosis spondylitis, there is often a decrease impaired appetite and ingested due to painful stimuli Swallowing pharynx abscess so that the fulfillment of nutrients to Less.

f. B6 (Bone)

1) Look

The curvature of the spinal cord is a visible and visible abscess in the paravertebral, abdominal, inguinal, and decubitus in the buttocks.

2) Feeling

If there is an abscess, there will be volatile fluctuations and the skin on it feels a bit warm (called a cold abcess, unlike a hot pyogenic abscess). This sensation may be palpable in the groin, the iliac fossa, retrofating, or on the side of the neck (behind the sternocleidomastoid muscle) depending on the degree of lesion that may also be felt around the chest wall area.

3) Move

Paralysis of the limbs (paraplegia) and bone disorders back.

2.3.1.4 Supporting investigation

According to Noor (2012), there are suporting investigation, those are :

a. Laboratory

1) Tuberculin skin test or tuberculin purified protein derivative (PPD) positive.
2) The rate of sedimentation of blood increases, from 20 to 100 mm or hour.
3) Leukocytosis.
4) Cerebrospinal fluid culture shows tubercle bacillus.

b. Radiology

1) MRI

It is of great benefit to distinguish the nature of complications compressive with noncompressive in

spinal tuberculosis and shows soft tissue involvement level.

2) CT-Scan

It is useful to visualize the thoracic region and the involvement of the ribs which is hard to see on plain photographs, posterior nerve engagement involving pedicles looks better with CT scans.

2.3.2 Nursing Diagnosis

According to the (Nurarif & Kusuma, 2013), the nursing diagnoses that may arise on client with tuberculosis spondylitis as follows:

1. Acute pain related to swelling and inflammation
2. Imbalanced nutrition less than body requirement related to swallowing disorders
3. Impaired physical mobility related to pain, discomfort, musculoskeletal damage, immobility advice
4. Risk of infection related to formation of bone abscess

2.3.3 Nursing Intervention

According Nurarif & Kusuma (2013), there are nursing diagnose, those are :

No	Nursing Diagnose	Intervention	Rational
1	Acute pain related to swelling and inflammation	1. Assess the state of the client PQRST. 2. Set physiological position. 3. Teach relaxation techniques such as deep breath when the pain comes. 4. Teach methods of distraction. 5. Give a touch of	1. Assist in determining the client's pain status and the basic data for intervention and the success of the intervention. 2. Increasing a sense of comfort by reducing the sensation press on the sore area. 3. Local hypoxemia cause pain and increase the supply of

		management in the form of light massage on the area of pain. 6. Give warm compresses on the area of pain. 7. Collaboration with analgesic administration periodically.	oxygen to the painful area may reduce pain. 4. Transfer of pain by distraction method can improve the response to cut spending endorphin pain receptors. 5. Increasing blood flow response in the area of pain and one distraction method. 6. Increasing the blood flow response area of pain. 7. Maintaining drug levels and avoiding the peak periods of pain.
2	Imbalanced nutrition less than body requirement related to swallowing disorders	1. Give the client the opportunity to discuss the reasons for not eating. 2. Observe and record patient intake (liquid and solid) 3. Offer a supplement high in protein, high in calories, such as milkshakes,pudding, or ice cream. 4. Serve foods that require little cut off or chewed. 5. Create a pleasant environment at mealtimes 6. Put snacks in the client's side of the bed. 7. Provide nutritious fluid and perpetually gradually introduced to solid foods. 8. Avoid asking whether	1. To help assessing the cause food disorders. 2. To assess the consumed nutrients and supplements needed. 3. These foods can prevent damage to body proteins provide caloric energy. 4. To help prevent malingering during meals 5. To increase the client's appetite. 6. To prevent given control patients at meal times. 7. Clients with severe malnutrition cannot be pried chew solid food. 8. Positive attitude, and do not charge to avoid confrontation with patients 9. This done had the patient to

		patients are hungry or want to eat, over food in a positive way. 9. If possible, sit with clients during the meal. 10. Monitor and record the pattern of elimination. 11. Measure the patient's weight at the same time every day. Give reinforcement with less weight gain praise or appreciation.	protect against wasting of time for eating or hide or bring food from outside. 10. Patients can use laxatives or diuretics to maintain a low weight because they do not like the food. 11. This action gives accurate data and giving control to the client about the food you eat and praise or reward to do
3	Impaired physical mobility related to pain, discomfort, musculoskeletal damage, immobility advice	1. Assess the scale of muscle strength 2. Change position at least every 2 hours. 3. Teach to do active and passive range of motion. 4. Ask family to help client in fulfill client's daily need 5. Arrange the goals with the client or family to participate exercise and change of position. 6. Collaborate give brain drug	1. Identify strengths or weakness and can provide information on discharge. 2. Reduce the risk of trauma or ischemia as decubitus 3. Active movement can provide the tone and muscle strength and improve heart function and breathing, decrease muscle weakness. 4. To keep client's daily needs fulfilled 5. Raising expectations to the development or improvement. 6. To avoid stroke
4	Risk of infection	1. Assess for the use of medication or treatment modalities that may cause immunosuppression 2. For patients at risk,	1. Antineoplastic agents and corticosteroids reduce immunocompetance 2. Classic signs of any infection are localized redness, heat, swelling and

		monitor the following for signs of actual infection: rubor, calor, tumor, dolor, functio laesa. 3. Monitor the body temperature of client. Notice the elevated temperature. 4. Maintain or teach asepsis for dressing changes and wound care, catheter care and handling, and peripheral IV and central venous access management. 5. Wash hand and teach other caregivers to wash hands before contact with patients and between procedures with the paients. 6. Encourage a fluid intake of 2000 to 3000 mL of water per day 7. Teach the patient or care giver to wash hands often, especially after toileting, before meals, and before and after administering self-care. 8. Collaboration to give antibiotics as indication.	pain. 3. Temperature of up to 38^0c (100.4^0f) for 48 hours after surgery is related to surgical stress; after 48 hours temperature greater than 37.7^0c (99.8^0F) suggests infection; fever spikes that occur and subside are indicative of wound infection; very high temperature accompanied by sweating and chills may indicate septicemia 4. Use of aseptic technique decrease the chances of transmitting or spreading pathogens to the patient 5. Friction and running water effectively remove microorganisms from hands. Washing between procedures reduces the risk for transmitting pathogens from one area of the body to another. 6. Fluids promote diluted urine and frequent emptying of bladder, reducing stasis urine, in turn, reduces risk for bladder infection or urinary tract infection 7. Patients and caregivers can spread infection from one part of the body to another, as well as pick up surface

			pathogens; hand washing reduces these risks. 8. Most antibiotics work best when constant blood level is maintained, a constant blood level is maintained when medications are taken as prescribed. The absorption of some antibiotics is hindered by certain foods; patients should be instructed accordingly.