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**EMERGENCY CARE AND MONITORING OF AN UNCONSCIOUS
CHILD PATIENT: A Literature Review**

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ABSTRACT

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<p>The subject of this thesis is emergency care and monitoring of an unconscious child patient. The aim of the study is to introduce the most common causes of unconsciousness in child patients and to demonstrate how to take care of an unconscious child patient. Consciousness and unconsciousness, care of unconscious patient, causes of unconsciousness and the special features of paediatric nursing are handled in the theory background. The study results can be used in different healthcare settings and the topic is always current since a person working in nursing care may face an unconscious patient despite the working environment.</p> <p>The thesis was carried out as a literature review which examined 14 articles. The purpose of the study was to gather information about the care of unconsciousness child patient and its special features. The study used scientific databases and professional literature to make the results reliable. In addition, the results were limited to meet stringent criteria such as only articles written in English and Finnish were included.</p> <p>The cause of the unconsciousness can be either traumatic or non-traumatic and may be divided into systematic and brain-related causes. Age of the child was one factor that affected the most common causes of unconsciousness. Clarifying the cause of unconsciousness and treatment occur simultaneously. It is important to take into account the age of the child, age-related anatomical and physiological changes, and family-oriented nursing when taking care of an unconscious child patient.</p>		
Key words		
emergency care, monitoring, paediatric nursing, unconsciousness		

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<p>Tämän opinnäytetyön aiheena on tajuttoman lapsen ensihoito ja monitorointi. Tavoitteena on esitellä yleisimmät tajuttomuuden syyt lapsipotilailla sekä havainnollistaa, miten tajutonta lasta hoidetaan. Tietoperustassa käsitellään tajuntaa ja tajuttomuutta, tajuttoman potilaan hoitoa, tajuttomuuden syitä sekä lapsipotilaan hoidon erityispiirteitä. Tutkimustuloksia voidaan hyödyntää eri terveydenhuollon toimiyksiköissä, ja aihe on aina ajankohtainen, sillä henkilö, joka työskentelee hoitoalalla, voi kohdata tajuttoman potilaan työympäristöstä huolimatta.</p> <p>Opinnäytetyö toteutettiin kirjallisuuskatsauksena, jossa tarkasteltiin 14 artikkelia. Tarkoituksena oli kerätä tietoa tajuttoman lapsipotilaan hoidosta ja sen erityispiirteistä. Tutkimuksessa käytettiin tieteellisiä tietokantoja sekä ammattikirjallisuutta, jotta tulokset olisivat luotettavia. Lisäksi tulokset rajattiin täyttämään tiukat kriteerit, kuten vain suomen- ja englanninkieliset artikkelit sisällytettiin tutkimukseen.</p> <p>Tajuttomuuden syy voi olla joko traumaattinen tai ei-traumaattinen, ja ne voidaan jakaa systemaattisiin ja aivoperäisiin syihin. Lapsen ikä oli yksi tekijä, joka vaikutti yleisimpiin tajuttomuuden syihin. Tajuttomuuden syyn selvittäminen ja hoito tapahtuvat samanaikaisesti. Hoidossa on tärkeää ottaa huomioon lapsen ikä, iän tuomat anatomiset ja fysiologiset muutokset sekä perhekeskeinen hoitotyö.</p>		

Asiasanat

ensihoito, monitorointi, lasten hoitotyö, tajuttomuus

ABBREVIATIONS

ABCDE-protocol	Airways, breathing, circulation, disability/ decision/ defibrillation/ definitive treatment/ dolour/ differential diagnosis, exposure/ environment
ARAS	brain stem activating system
AVPU method	A as alert, V as voice responsive, P as pain responsive, U as unresponsive.
CPR	Cardiopulmonary resuscitation
CT-scan	Computed tomography
ECG	Electrocardiography
EEG	Electroencephalography
GCS	Glasgow Coma Scale
MRI	Magnetic Resonance Imaging
PGCS	Pediatric Glasgow Coma Scale
PEA	Pulseless electrical activity

ABSTRACT
ABBREVIATIONS
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1 INTRODUCTION

Unconsciousness is lack of awareness. An unconscious patient cannot be awakened and he or she does not respond to external stimulus such as pain. It is essential to determine the cause of unconsciousness immediately since unconsciousness is a directly life threatening condition. Unconsciousness is not a disease and therefore, it is essential to sort out and treat the primary reason of the condition in order to have a better prognosis. The prognosis is always related to the cause of unconsciousness; intracranial cause of unconsciousness has the weakest prognosis. If the cause of unconsciousness is other than a post-traumatic reason it leads to death in two out of three cases. It is difficult to face an unconscious patient especially if the cause is unknown. (Kallela, Häppölä & Ericksson 2014.)

Usually, the cause of unconsciousness is either systematic (for example metabolic or toxic reason) or brain-delivered (for example structural intracranial reason). Psychological cause of unconsciousness is rare (about 1%). (Kallela et al. 2014.) It is essential that the multi-professional team in acute care nursing has comprehensive knowledge and skills to examine and take care of the unconscious child patient since a child patient is not a common patient in acute care.

It is important to understand that pediatric nursing has its own special features which should be taken into account while taking care of a critically ill child patient. The keystones of pediatric nursing are good treatment and monitoring. In addition, it is essential that the nurses are able to use the needed technical equipment, machines and aids in order to provide professional nursing care. Furthermore, one vital part of pediatric nursing is to provide support and comfort for the parents, siblings and other relatives. The aim of pediatric nursing is to support and maintain the vital functions, prevent further complications and support health promotion. Nurses are in charge of basic and specialized nursing care of the critically ill child patient. (Storvik-Sydänmaa, Talvensaari, Kaisvuori & Uotila 2013.)

The purpose of this study is to gain knowledge of the nursing process of an unconscious child patient. Researcher's own interest in pediatric nursing and acute care nursing motivated the researcher to choose this topic to be studied. The study results can be used in different

healthcare settings and the topic is always current since a person working in nursing care may face an unconscious patient despite the working environment.

2 THEORETICAL FRAMEWORK

The main concept of this thesis work is examining an unconscious child patient. Consciousness and unconsciousness, care of unconscious patient, causes of unconsciousness and the special features of pediatric nursing are handled in the theory background.

2.1 Consciousness and unconsciousness

According to Marcovitch (2011) “the brain is the organ of the mind” and it needs continuous adequate supply of oxygen and glucose in order to function normally. Interruption of either of them will lead to disturbances in consciousness. (Marcovitch 2011.) Consciousness and unconsciousness can be determined in several ways. Generally speaking, consciousness means awareness of oneself and the environment; it is the state of being aware of physical events and mental concepts. Awareness means the ability to combine the data in memory to the surrounding internal and external stimuli. When a person is conscious, he or she is awake, responds to his or her surroundings and behaves meaningfully. Unconsciousness means lack of this awareness. (Marcovitch 2011; Puumalainen 2005; Westergård 2009; Lindsberg & Soinila 2015.)

In addition, consciousness can be roughly divided into the content of consciousness and the level of consciousness. The content of consciousness covers one’s thoughts, experiences, sensations, imaginings and memories. Disturbances in content of consciousness occur such as confusion and other cognitive and psychological disorders. By contrast, disturbances in the level of consciousness lower the state of alertness. (Puumalainen 2005; Westergård 2009.) Concepts attentiveness and alertness are related to the level of consciousness. (Lindsberg & Soinila 2015a.) The level of loss of consciousness varies from drowsiness to a deep state of unconsciousness from which the patient cannot be awakened. (Nurmi & Alaspää 2013.) According to the state of unconsciousness the patient may respond to different external stimuli such as pain. (Westergård 2009.)

When someone’s consciousness level decreases his or her state of alertness gradually declines from somnolence to coma. Although a person can be confused after waking up from

deep sleep, there are various essential differences between sleep and unconsciousness. Both sleep and unconsciousness have similar features, however when someone is asleep he or she can be awakened and reverted to normal state of alertness. In addition, unlike unconsciousness, sleep is a state that the brain produces actively and the brain develops during sleep. (Lindsberg & Soinila 2015b.)

Somnolence is a state where the patient can be awakened with sound stimuli. However, the level of consciousness is weakened and it is hard for the patient to keep up the normal state of alertness. It is similar to the state if someone has lack of sleep. Stupor is deeper state of unconsciousness where the patient is confused, disorientated and responds to stimuli such as speech slowly or not at all. If the patient is unconscious, he or she cannot be awakened. If the patient is in coma, he or she does not respond to any external stimuli, not even pain. Persistent vegetative state is when unconsciousness has lasted long time and the patient is not capable in meaningful communication, even though the patient is able to open his or her eyes, follows the normal sleep-awake rhythm, and the autonomic nervous system functions normally. (Lindsberg & Soinila 2015a.) Brain death, wherein the brain function has ceased irreversibly, is the deepest level of unconsciousness. (Puumalainen 2005.)

Brain death is diagnosed when the brain function is permanently ceased and the reason or the pathophysiological mechanism has been clarified even though the heart is still pumping. It is essential to follow up the brain function at least one day and exclude the possibility of intoxication, hypothermia and other causes of temporary disturbances in brain function before the final diagnosis. In addition, body temperature must be above 32 degrees Celsius when making the diagnosis which must be taken into account especially with hypothermia patients. There is no pain stimuli, muscle tonus, spontaneous movements or any brain stem reflexes if the patient is brain dead. If the patient is stiffened or has convulsions, he or she is not brain dead. In addition to clinical observation, it is always necessary to take either CT-scan or MRI of the brain. Other possible examinations are angiography, toxicology and concentration of drugs in the body, EEG and apnea test. Indication of the absence of intracranial blood circulation ensures the diagnosis of brain death. Each brain death patient is potential organ donor. It is essential to make the diagnosis without delay in order to avoid unintentional and unethical treatment. (Roine & Lindsbeg 2015.)

Unconsciousness is not a disease and therefore, it is essential to find out the underlying condition of the patient (Kallela et al. 2014.) According to Lindsberg & Soinila (2015a), confusion, disorientation, stupor and coma should be used as diagnosis alone in situations where the underlying condition of the patient is unknown. It is important not to waste time when solving the cause of unconsciousness since an unconscious patient is often critically ill and unconsciousness can be a life-threatening condition. However, in some cases, unconsciousness is a transitory state and can be treated in the emergency situation. (Castren, Helveranta, Kinnunen, Korte, Laurila, Paakkonen, Pousi & Väisänen 2012; Herrgård, Heiskala & Immonen 2012; Kallela et al. 2014.)

Unconsciousness can be transitory, protracted or undetermined depending on the underlying condition. Patients' prognosis of recovery depends on the cause of unconsciousness and the success of the treatment. Short periods of unconsciousness usually have no effects or only minor effects on the brain function. However, if the state of unconsciousness is prolonged, memory as well as motor and sensory functions can be affected. Furthermore, repeated bouts of unconsciousness may have cumulative damaging effects on the brain. (Marcovitch 2011.) The prognosis of the patient is always related to the cause of unconsciousness. In order to have a better prognosis, it is important to sort out the primary reason of unconsciousness and treat it properly. Unconsciousness caused by intracranial reason has the weakest prognosis. (Kallela et al. 2014.) Two out of three patients die if the cause of unconsciousness is other than a post-traumatic reason. (Kallela et al. 2014; Lindsberg & Soinila 2015c.)

2.1.1 Care of unconscious patient

Care of an unconscious patient is very straightforward and the general principles are simple. In the first instance, it is always essential to assess the vital functions: airways, breathing and circulation, and prevent aspiration to avoid any further damages and stabilize the patient's condition. Next, it is important to observe the changes in consciousness level and exclude the possibility of hypoglycemia. Finally, other examinations, such as laboratory and radiological investigations, are usually carried out. It is important to diagnose the cause of unconsciousness to begin the right and effective treatment. In addition, it is essential to interview possible eyewitnesses and find out any history of diseases or medication which could have led to

unconsciousness. (Castren et al. 2012; Herrgård et al. 2012; Kallela et al. 2014; Kallela & Lindsberg 2016.)

Since extensive areas of the brain are involved in the regulation of consciousness, a relatively extensive disorder in the brain is underlying the state of unconsciousness. (Puumalainen 2005.) Unconsciousness is a sign of different degrees of malfunction either in the brain stem activating system (ARAS) or in both cerebral hemispheres simultaneously. Hence, for example, one-sided hemisphere damage does not lead to unconsciousness, unless its mass effect extends to the other side of the brain or to the brain stem. (Kallela et al. 2014.) According to Castren et al. (2012) an unconscious patient is always a high risk patient. It is essential to monitor the patient and document patients' actions and consciousness level in regular basis especially in the beginning of the treatment. Once the patient is stable and the cause of unconsciousness is clear, monitoring can be reduced step by step. (Kallela et al. 2014; Ahonen, Blek-Vehkaluoto, Ekola, Partamies, Sulosaari & Uski-Tallqvist 2014.)

Initial assessment of the unconscious patient is done by utilizing the ABCDE-protocol. The airways are opened, possible foreign objects are removed, and cervical spine is supported if needed. Breathing and chest movements are observed and sufficient ventilation and air flow are ensured. If unconsciousness lasts more than ten minutes, the patient may get breathing problems. Good positioning is essential in order to ensure patients' breathing. Intubation standby is vital if patient is unconscious. Adequate circulation can be ensured with normal saline or Ringer, and pulse should be palpated. In addition, any shock symptoms should be considered and abundant external bleedings noted and managed. (Aalto 2009; Ahonen et al. 2014.)

After patients' airways, breathing and circulation have been observed, the following activities are carried out: assessment of patients' injuries and neurological status; making decision on emergency care actions; in case of cardiac arrest using defibrillation; definitive treatment (for example stabilization of pulsating rhythm); identifying if the patient is in pain and pain management; differential diagnosis. The last actions according to ABCDE-protocol are exposing injuries of a trauma patient and observing the environment which includes protecting the patient against any danger from the environment and observing the environment for anything that could have caused the unconsciousness such as empty medicine packaging, drugs or poisons. After the initial assessment the necessary emergency measures are done,

a decision is made whether the patient needs rapid transportation to follow-up treatment place. In addition, it is estimated if there is a need to call further assistance to the emergency situation or continue to detailed assessment of the patient and environment. These actions are carried out partly simultaneously with the initial assessment. (Aalto 2009.)

The following examinations are done for unconscious patients: monitoring circulation (blood pressure, pulse and ECG), monitoring saturation, testing blood sugar level, testing alcohol content of exhalation and monitoring neurological status (Glasgow coma scale (GCS), paralysis, semi differences, pupils and Babinski reflex). (Castren et al. 2014.) In addition, it is important to monitor the skin condition since skin color can be a sign of different conditions, for example bluish color refers to lack of oxygen and yellow color to liver damage. Moreover, temperature must be monitored and possible changes on temperature in different parts of the body should be noted and taken into account. Furthermore, fluid balance of the patient should be monitored at least once a day. The color, amount and possible blood in urine, and other secretions such as blood, vomit and bowel motions should be monitored at least once in daily basis. In addition, electrolyte balance is controlled with laboratory examinations and severe imbalances should be corrected. (Ahonen et al. 2014.)

TABLE 1. Glasgow Coma Scale Scores adapted from Karimi, Fahimzad & Ghanaie 2013.

Glasgow Coma Scale (GCS) Scores		
Open eyes <ul style="list-style-type: none"> • 4 Spontaneous • 3 In response to commands • 2 To painful stimuli • 1 No response 	Audio response to stimuli <ul style="list-style-type: none"> • 5 Oriented • 4 Confusion, disoriented • 3 Inappropriate words • 2 Incomprehensible sounds • 1 No sound 	Motor response to stimuli <ul style="list-style-type: none"> • 6 Obey the commands • 5 Localize in response to painful stimuli • 4 Withdraw in response to the painful stimuli • 3 Abnormal flexion in response to painful stimuli (Decorticate) • 2 Abnormal extension in response to painful stimuli (Decerebrate) • 1 No response

Neurological status of an unconscious patient should be monitored regularly, in the beginning of unconsciousness after every 10-15 minutes. If the neurological status changes, needed actions should be performed. GCS is used to assess how the patient reacts to different external stimuli such as pain and speech. Motion response to stimuli is the most important when assessing an unconscious patient. In addition, audio response to stimuli and eye opening are assessed. Patient is deeply unconscious if he or she does not respond to pain and/ or gets less than 9 points in GCS. The maximum points in the test is 15. (Castren et al. 2012.) The scoring for GCS are shown in table (TABLE 1) Glasgow Coma Scale Scoring. To assess the neurological status of an unconscious patient correctly, strong sedation should be avoided since it hinders clarifying the neurological status (Lindsberg & Soinila 2015d.)

2.1.2 Causes of unconsciousness

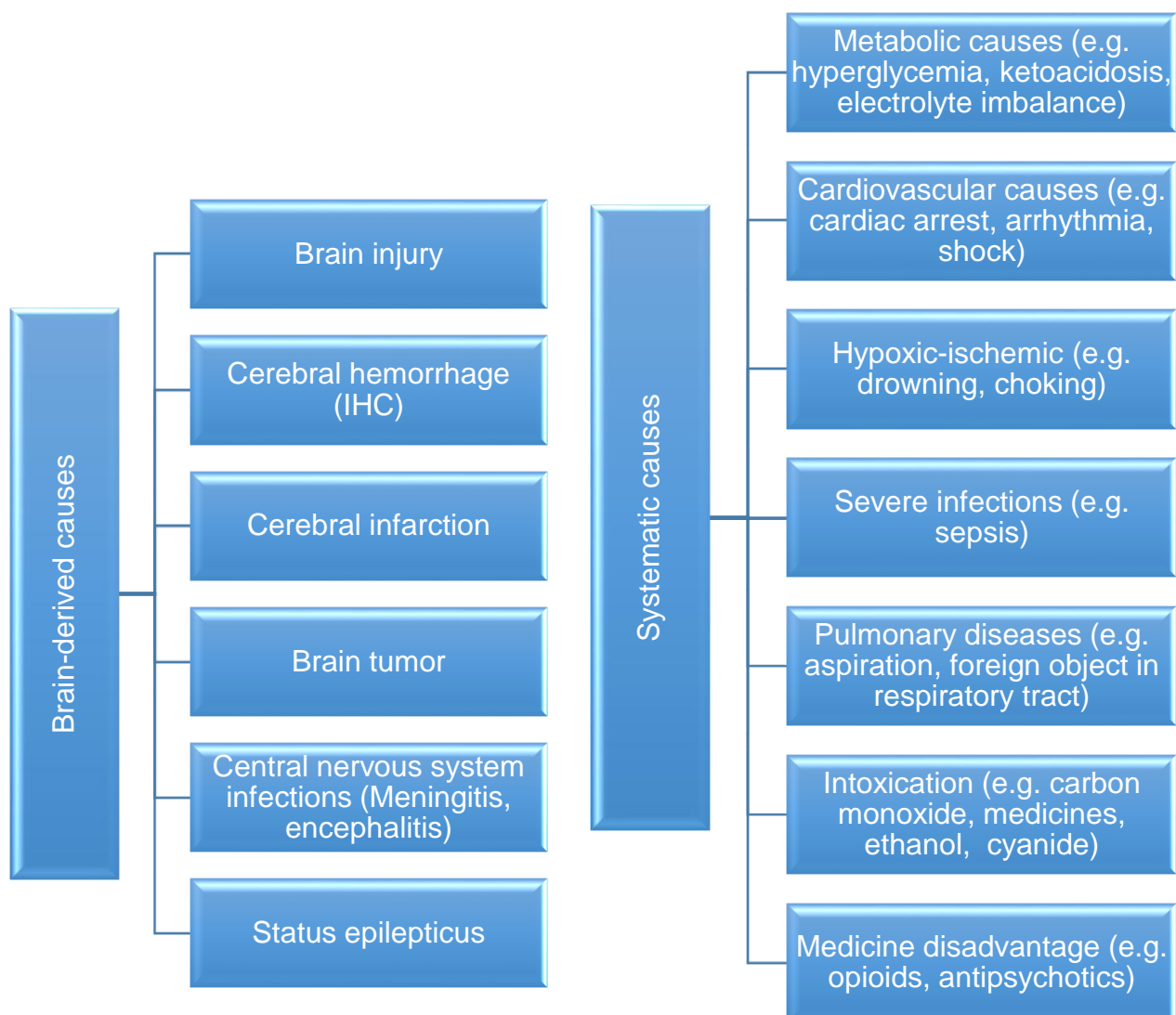
Causes of unconsciousness can be divided in systematic (throughout the body associated) causes and brain-derived causes. Loss of consciousness is usually caused by metabolic or toxic reasons, and in rest of the cases by structural intracranial reasons. Psychological cause of unconsciousness is rare (about 1% of the cases). (Kallela et al. 2014.) Unconsciousness is the eleventh most common reason for acute care. More than half of the cases of unconsciousness are caused by systematic causes which includes metabolic, cardiovascular and hypoxic-ischemic causes, infections, medicine disadvantages and intoxications. Brain-derived causes are causes associated with hemisphere and brain stem as well as elevated intracranial pressure. (Puumalainen 2005.)

The cause of unconsciousness plays an important role on patients' prognosis. If the cause is metabolic the patient has better prognosis than if the cause is cerebral. In addition, studies show that the longer and deeper the state of loss of consciousness is, the more severe is the cause of unconsciousness. (Kallela et al. 2014.) Brain-derived and systematic causes of unconsciousness are shortly introduced and explained in the following paragraphs and divided into two groups in graph (GRAPH 1.) causes of unconsciousness.

Brain injury. The main symptom of a brain injury is decreased level of consciousness. (Castren et al. 2014.) Severe head injuries may cause unconsciousness that lasts hours or even several days. Furthermore, a severe brain injury may cause memory loss from the period

before and after the unconsciousness. In addition, in the most severe cases brain injuries may cause physical disabilities, epilepsy and changes in intelligence, rational judgment, and behavior. Moreover, symptoms of so called post-traumatic syndrome may occur such as headache, forgetfulness, irritability, slowness, poor concentration, fatigue, dizziness, intolerance of alcohol, light and noise, loss of interest and initiative, depression, anxiety, and impaired libido. (Marcovitch 2011.)

GRAPH 1. Causes of unconsciousness adapted from Westergård 2009; Nurmi & Alaspää 2013.



There are different types of skull and brain injuries depending on what caused the injury: how much energy was involved, where the injury is and what is the patient status. Type of the injury determines how fast and deep the level of unconsciousness proceeds. Usually, level of consciousness decreases fast within hours if there is hemorrhage in the brain. As treatment, the hematoma should be removed as rapidly as possible. In some cases, the hemorrhage becomes chronic and the symptoms occur slowly within months. If a patient has headache, nausea, forgetfulness, neurological deficiencies and decrease in the level of consciousness, the cause might be chronic subarachnoid bleeding if there is no other explanations and if the patient has fallen down or hit his or her head recently. (Castren et al. 2012.)

Cerebral hemorrhage and cerebral infarction are both serious causes of unconsciousness and their mortality rate is relatively high (up to 40%). The symptoms arise suddenly and it is essential to get treatment rapidly since delay increases the chance of getting permanent damage in the brain function. Multi-professional rehabilitation is needed after cerebral infarction. Subarachnoid bleeding occurs typically within young healthy adults during physical activity while intracerebral hemorrhage and cerebral infarction usually occurs within elderly people. Each year around 14 000 people in Finland gets cerebral infarction. Healthy lifestyle is essential in prevention of cerebral infarction. (Castren et al. 2012; Atula 2015.)

Central nervous system infections caused by both bacteria and viruses are commonly divided into meningitis and encephalitis. Bacterial meningitis is the most severe form of central nervous system infections leading to death in close to 50% of the cases despite of intensive care. The patient may have pre-symptoms similar to flu before the main symptoms high fever, stiffness of the neck and petechial on the skin appear. In addition, level of consciousness and general condition collapse rapidly within a few hours and the patient usually gains septic shock due to blood poisoning. However, bacterial meningitis is relatively rare condition nowadays. Encephalitis is often caused by viruses and is often less serious than meningitis. However, in some cases it leads to unconsciousness, and other common symptoms are tiredness, headache and convulsions. (Castren et al. 2012.)

Status epilepticus is a condition where epileptic seizure has lasted 30 minutes or longer, or the patient does not wake up between the epileptic conditions (Forss & Varpula 2015.) Epileptic seizure means a transient disorder in the brain function, which is caused by disturbances in the electrical activity of nerve cells. Usually, the seizure lasts from seconds to minutes,

however, sometimes it can be prolonged to hours or days. (Eriksson, Gaily, Laukkala, Liukkonen, Rantala, Vieira, Heiskala & Sillanpää 2013.) Up to a tenth of the population have an epileptic seizure during their lifetime and half of them suffer from epilepsy. However, only around 1% of them need constant medication. (Kälviäinen & Mervaala 2013.)

When a patient gets the first epileptic seizure, it is essential to exclude the possibility of **brain tumor** since epileptic seizure is the most common symptom of brain tumor. In addition, child patients usually have balance disorder, and headache, nausea and vomiting and papilledema related to increased pressure in the brain. Moreover, brain tumor can cause progressive symptoms of paralysis, as well as changes in psyche and cognitive functions. The symptoms of brain tumor primarily depend on the location of the tumor and secondarily on growth speed and growth habit of the tumor. The incidents of brain tumor increases with age. Within child patients, it is the most common solid tumor, and overall the third most common type of tumor after leukemia and lymphoma. (Kallio & Ilveskoski 2009.)

Metabolic causes such as hyperglycemia, ketoacidosis, and electrolyte imbalance may lead to unconsciousness. There are several factors that influence metabolic balance for example stress, infections, and diet, exercising and climate changes. Diabetes is a relatively common metabolic disorder which causes imbalances in blood sugar level. Hypoglycemia (low blood sugar level) shows symptoms rapidly while ketoacidosis (high blood sugar level) develop slowly and can be life-threatening. Both conditions require hospitalization if the patient is unconscious. In Finland, around 200 000 people suffer from diabetes and in addition, there are several thousand people with undiagnosed diabetes. (Miettinen & Rajantie 2016; Castren et al. 2012.)

Efficient blood circulation is required in order to secure that the body cells receive enough oxygen and maintain their capability to function. **Cardiovascular causes** (e.g. cardiac arrest, arrhythmia, and shock) of unconsciousness are severe conditions and can lead to lack of oxygen in important organs such as the brain and heart. There is damage in the brain cells already 4-6 minutes after cardiac arrest, therefore it is essential that the patient gets good care urgently in order to improve the prognosis. Severe bleeding, dehydration, severe infection and allergic reaction are factors that can lead to shock. The symptoms are similar if the cause is cardiovascular for example respiratory distress, cold sweat, nausea, and (agonized) pain. Interruption of heart pumping caused by coronary heart disease is the most common cause of sudden death. (Castren et al. 2012.)

The cause of unconsciousness can be difficulty of oxygen supply caused by **hypoxic-ischemic** (e.g. drowning, choking) reason, **severe infections** (e.g. sepsis) or **pulmonary diseases** (e.g. aspiration, foreign object in respiratory tract). It is essential to ensure oxygenation and continuous breathing since breathing problems can cause severe lack of oxygen in the cells. (Castren et al. 2012.) When drowning a person swallows fluids causing hypoxia which leads to unconsciousness, decreased heart rate and cardiac arrest. Correction of hypoxia is the keystone when resuscitating the drowned person. The longer the hypoxia lasts the more severe are the consequences and already 10 minutes delay weakens the neurological prognosis. (Rautiainen 2011.)

Infection in the respiratory system can cause swelling in the larynx which causes breathing problems and may lead to unconsciousness. Exhaling and speaking become more difficult and breathing and pulse quicken. In addition, the lips become bluish. (Castren et al. 2012.) Furthermore, blockage in the respiratory tract, usually foreign object with children or food with adults, causes breathing problems. Total blockage leads to unconsciousness since the patient is not able to breathe. Medical examination must be carried out if the patient was unconscious or external help such as the Heimlich Maneuver was used to remove the foreign object. (Martikainen 2016.)

Intoxications (e.g. carbon monoxide, medicines, ethanol, and cyanide) and **medicine disadvantages** (e.g. opioids, antipsychotics) can cause unconsciousness and may be life-threatening depending on which substance it is, the amount of the substance and how it entered the body (swallowed, inhaled, on the skin, in the eye). First aid is to rinse out the affected area (mouth, skin or eye) with plenty of water. The patient should not vomit the poison since it can make the symptoms worse. A patient with unconsciousness, breathing or swallowing problems, or having corrosion is taken to the hospital immediately. Ensuring the vital functions is the cornerstone of taking care of an intoxicated patient. In Finland, the Poison Information Center (Myrkytystietokeskus) is responsible for guiding the population about intoxications. (Keituri & Laine 2012.)

2.2 Special features of pediatric nursing

A healthy child is growing and developing normally. Child's growth phase begins from birth and ends when the child is a grown up adult. Development phase can be divided in the following sub-areas: physical growth and motor development, cognitive development and psycho-social development. (Storvik-Sydänmaa, Talvensaari, Kaisvuori & Uotila 2013; Leppäluoto, Kettunen, Rintamäki, Vakkuri, Vierimaa & Lähti 2013.) Child's normal development and growth are a prerequisite for embracing skills, knowledge and feelings i.e. learning from the surrounding world. Good physical and psychological conditions are required for normal growth. Growth pattern is in hereditary factors, and can be divided in three phases: initial growth in fetal life and infancy, steady growth in childhood and growth spurt in puberty. (Lenko 2002.)

Child's body goes through different anatomical and physiological changes during childhood and adolescence which has to be taken into account while nursing a pediatric patient. According to Storvik- Sydänmaa (et al. 2013) the most initial physiological changes happen while the baby is born since the linkage between placenta and the fetus is lost. There is rapid and great changes in the newborn's respiratory tract and blood circulation. In addition, the size of the newborns skin add some challenges to heat production and fluid metabolism compared to adults. Furthermore, the kidneys do not function normally until the age of a few months which has to be taken into account for example when administering medicines. The size and proportions of child's and adult's organs are different. Compared to adults, child has quite large brain and liver, large head and long limbs. However, the reproductive organs do not begin to develop until puberty. Child's metabolism is more active, bone fractures heal more rapidly and body has higher liquid content than adults. (Leppäluoto et al. 2013.)

Examining a pediatric patient differs from examining an adult patient in many different ways. Physiological features related to child's growth and development should be taken into account when examining a pediatric patient. Variety of diseases is partly different in adult and pediatric patients, and same diseases can show different kind of symptoms in different stages of age. In addition, the same symptom can be caused by different disease in adult and pediatric patients. (Salonen 2009.) There are various matters that must be taken into account while examining children in different age-groups, these are presented in table (TABLE 2.) History taking in different ages.

TABLE 2. History taking in different ages adapted from Waterson, Helms and Ward Platt (2006).

History taking and examining a child in different ages				
<u>Neonates</u>	<u>Infants</u>	<u>Pre-school children</u>	<u>School-age</u>	<u>Adolescents</u>
<ul style="list-style-type: none"> • obstetric history of the mother • maternal medication • details of the delivery • name of the baby • Examining <ul style="list-style-type: none"> • Routing examination including e.g. weight, length and head circumference • in case of emergency ABC • observe - feel - listen 	<ul style="list-style-type: none"> • less detailed obstetric history • growth e.g. weight • feeding history • immunisation history • developmental history including hearing and vision • Examining <ul style="list-style-type: none"> • observe developmental milestones e.g. sitting, and neurodevelopment e.g. Moro, grasp and stepping reflexes • observe (skin, genitalia, signs of abuse etc.) • feel (fontanelle, lymph nodes, pulse, abdomen and groins etc.) • listen (heart, lungs) • ears and throat 	<ul style="list-style-type: none"> • some birth details, emphasis in child's own history • playschool (infections/socialisation) • immunisation history • growth history and diet • medical history • behaviour and toileting • Examining <ul style="list-style-type: none"> • do the examination of the child while he/she is sitting on mother's lap • making a game of examination, warm hands/equipments, and rapidity • focus and explain • report what examination was done and could not be done 	<ul style="list-style-type: none"> • information about school performance, peer group attitudes, sporting activities • problems at school • developmental history (skills, abilities) • talking about possible problems such as behaviour issues only with parents • Examining <ul style="list-style-type: none"> • systematic examination <ul style="list-style-type: none"> • weight & height • femoral pulse 	<ul style="list-style-type: none"> • there are problems that are better not talked with parent <ul style="list-style-type: none"> • opportunity to talk in private is essential • attitudes towards the problems • confidentiality • school performance and activities outside school • Examining <ul style="list-style-type: none"> • similar to that for adults • sensitivity • puberty • weight & height • examine externally and genitalia for signs of abuse • girls may be pregnant • autonomy and responsibilities

Family-centered approach is initial in pediatric nursing. (Storvik-Sydänmaa et al. 2013.) When meeting the sick patient, nurse should present him or herself both to the child and to the parents in order to make a good connection. Eye contact and using ones name when talking to them are essential. The encounter should be warm and friendly, by smiling a nurse can unload child's fear. (Waterson, Helms and Ward Platt 2006.) Child's parents are usually shocked when their own child is ill and they want to participate in the treatment of their child. In addition, comforting and supporting the parents, siblings and other family members is an important part of pediatric nursing. (Storvik-Sydänmaa et al. 2013.) Furthermore, listening to the child patient, making a good connection and emergence of trust between the child and professional health care worker are a premise of examining the child patient. (Salonen 2009.)

Privacy and confidentiality are essential. It is also important to consider the age of the child, for example, by comforting the younger patients with toys and considering the own rights of older children. Both parents and the child should be included in the discussion, and active and emphatic listening should be promoted. In addition, the following matters are important when counselling a child patient: family history of illnesses, social history, immunization history, medication history, allergies, and exposure to pets and travelling. (Waterson, Helms and Ward Platt 2006.)

3 RESEARCH QUESTION

The purpose of the study was to gather information about acute care of an unconscious child patient. The aim of the study was to introduce the most common reasons for unconsciousness in child patients and to demonstrate how to take care of an unconscious child patient. In addition, the aim was to develop researcher's own theoretical knowledge and professional skills in practical work. The research questions were formed as follows.

1. What are the most common reasons for unconsciousness in child patients?
2. How to act in an emergency situation when a child is unconscious?
3. How to monitor an unconscious child patient?

The results can be used in acute care nursing when taking care of an unconscious child patient.

4 METHODOLOGY AND DATA COLLECTION

There are different methods that can be used when a research is done such as literature review, quantitative research, qualitative research and action research. Which method is used in the research determines how the data is collected and analyzed. This chapter describes the method used in the present research and how the data has been collected and analyzed.

4.1 Literature review

The researcher has conducted a literature review method in this research. The aim of a literature review is to summarize the literature that is available on a specific topic. Literature review is an important study method as it presents an analysis of available literature and thus, the reader does not necessary need to read all the resource material used in the review. Health care professionals must have up to date professional knowledge and therefore, literature reviews are important in health care sectors as it is impossible to study all the increasing amount of literature. In addition, it is possible to get a misleading picture of the topic by reading just one research about the particular topic since the information of the topic can be too narrow in one research study. (Aveyard 2014.)

While making a literature review it is important to see the whole picture of the research phenomenon. By comparing and analyzing the available literature of the certain topic, new discoveries can be brought up. Complete picture of the research phenomenon stays partially hidden if the studies and other information are viewed in isolation and not combined by utilizing a literature review. Recent emphasis on evidence-based practice and partly also increase in information technology are the main reasons for increasing availability of literature and information in the field of Social and Health Care. (Aveyard 2014.)

Carrying out a literature review pursues a certain technique as any other research method. When the researcher started writing this research study, the first step was to come up with the research questions and the aim of the research, and making a plan of the research process. Next step was to define the terms and concepts, and look for evidence based and relevant articles for the research. To ensure the reliability of the articles used in the present research

only scientific databases (Oppiportti, Terveysportti, Google Scholar, Science Direct and SAGE Journals (CINAHL, OVID)), and professional literature were used when collecting the data. The inclusion and exclusion criteria are shown in table (TABLE 4.) Inclusion and exclusion criteria were used to find the most appropriate articles for this research. Once the most relevant articles were chosen they were analyzed in order to get a deeper understanding of the phenomenon. In the end, the findings were discussed and a conclusion was written based on the literature used. (Mäkinen 2005; Cronin, Ryan & Coughlan 2008.)

4.2 Inclusion and exclusion criteria

It is essential to keep a literature review simple and therefore, anything unnecessary was avoided in the research. Material used in literature review should not be more than 10 years old therefore, articles published before 2006 were excluded from this study and articles published after 2006 were included. Scientific articles, e-publications and professional literature were used in the literature review. Only sources that were written in English or Finnish were used in the research since a translation is always a risk when writing a literature review, and the researcher does not speak any other languages fluently enough in order to use them as sources. The researcher did not get any financing for the research, and therefore, only open access articles and books from library were suitable to use and charged articles and other sources were excluded from the research. (Mäkinen 2005; Cronin, Ryan & Coughlan 2008.)

TABLE 3. Inclusion and exclusion criteria adapted from Mäkinen 2005; Cronin, Ryan & Coughlan 2008.

Inclusion criteria	Exclusion criteria
Full text available	Full text not available
Free access	Charged access
Articles published from the year 2005 to the date	Articles published before 2005
Articles published in English, Finnish	Articles published in other languages than English, Finnish
Articles are relevant to the purpose of the study	Articles are not relevant to the study

4.3 Data collection and data analysis

The data was analyzed straight after it was collected. (Mäkinen 2005.) The data was collected from different scientific databases as shown in table (TABLE 4.) Data collection. The data was analyzed and synthesized by using different strategies which helped to construct and write the review. At first, the data was read through in order to get an overall view of the phenomenon. Cohen's (1990) method of four stages: preview, question, read, and summarize (PQRS) was used while the data was analyzed in order to get a more systematic and critical review of the phenomenon. The articles were divided in primary and secondary sources, and some of them were excluded and filed in order to come back to them if it was needed. The articles used in the research were recorded in appendix (APPENDIX 1.) Summary of the articles. In total 14 articles were chosen to this research. One of them was prospective descriptive study, and the others were literature reviews. The table introduces the articles used in this study, and includes the main points and findings of the articles. (Cronin, Ryan & Coughlan 2008.)

TABLE 4. Data collection

Database	Headword	Results
Science Direct	unconsciousness	8 articles, 0 hit
	consciousness	105 articles, 1 hit
	pediatric nursing	118 articles, 0 hits
	emergency care AND child patient	119 articles, 0 hits
SAGE Journals	unconsciousness AND pediatric nursing	3 articles, 1 hit
	unconsciousness AND children	497 articles, 1 hit
	emergency care AND children	1040 articles, 1 hit
Google Scholar	unconsciousness	2 hits
	emergency care	1 hit
Oppiportti	tajuttomuus AND lapsipotilas	3 hits
	lastenhoitotyö	2 hits
Terveysportti	tajuttomuus AND lapsi	1 hit
	ensihoito	1 hit

Once the data was analyzed, the findings were presented in order to demonstrate researcher's knowledge of the phenomenon in a clear and consistent way. The study was written in clear

and firm language by using short sentences. The study includes introduction, main body and conclusion of the phenomenon. The last step was to write an abstract of the research. (Cronin, Ryan & Coughlan 2008.)

5 FINDINGS

The findings of the research are presented in this chapter. At first, the most common causes of unconsciousness in child patients are introduced. Then, directions on how to act in an emergency situation when child loses consciousness, and how to take care and monitor an unconscious child patient, are presented.

5.1 Causes of unconsciousness in child patients

“Consciousness can be defined as the state of awareness of self and environment and the alertness to external stimulation, besides responsiveness to inner need” (Calabro, Milardi, Cacciola, Marra, Digangi, Casella, Manuli, De Luca, Silvestri & Bramanti 2016.) Unconsciousness is one of the most common reasons for emergency care, according to a study by Fouad, Haron, Halawa & Tantawy (2009), 14.4% of all pediatric emergency cases were non-traumatic neurological emergencies. According to Rantala (2016) the anamnesis of unconsciousness is often clear since the preceded symptoms lead to correct diagnosis. Therefore, it is essential to determine the background of the patient at first in order to find out the cause of decreased consciousness level (Karimi, Fahimzad & Ghanaie 2013.) However, if there is no eyewitness for the preceded symptoms for example seizure or the doctors are misled intentionally for example due to child abuse, it is harder to make the right diagnosis (Rantala 2016.)

The cause of unconsciousness is either traumatic or non-traumatic, and it can be brain-derived or systematic. Non-traumatic causes are more common within younger patients and traumatic within older patients, especially teenagers. (Karimi et al. 2013.) It is essential to not waste time when making the diagnosis and beginning the right treatment. (Rantala 2016.) According to Hiippala (2013) around one third of young adults have fainted during their childhood. Usually if a child loses consciousness the cause is benign, and only a small part of the cases are severe. Thus, for example cardiogenic cause of unconsciousness may lead to sudden death. If loss of consciousness occurs during physical activity, further examinations are always needed. (Hiippala 2013.)

TABLE 6. Causes of unconsciousness (non-traumatic) adapted from Karimi et al. 2013 & Fouad et al. 2009.

Non-traumatic causes of unconsciousness and coma		
<p>Study 1</p> <ol style="list-style-type: none"> 1. Infectious diseases, 60% 2. Toxins, 19% 3. Status epilepticus, 10% 4. Intracerebral hemorrhage, 7% 5. Miscellaneous, 4% 	<p>Study 2</p> <ol style="list-style-type: none"> 1. Brain shunt dysfunction, 9,4% 2. Metabolic disorders (diabetes ketoacidosis) 7,6% 3. Poisoning, 7,6% 4. Infections (meningitis, encephalitis, systemic infections), 7.32% 5. Hypoxic injuries (drowning, electric shock, suffocation) 6% 6. Unknown, 5% 7. Status epilepticus, 4.29% 8. Miscellaneous (acute disseminated encephalomyelitis, vasculitis, hypertension encephalopathy) 3,7% 	<p>Study 3</p> <ol style="list-style-type: none"> 1. Metabolic/ toxic, 33% 2. Infections, 28% 3. Hematological disease, 13% 4. Congenital CNS malfunctions, 8% 5. Post status epilepticus, 7% 6. Brain tumors, 6% 7. Autoimmune disease, 3% 8. Idiopathic, 2%

According to Rantala (2016) epilepsy seizures are the most common cause of unconsciousness among child patients. Usually, consciousness reverts quickly after the seizure. Brain-derived causes of unconsciousness (central nervous system infections, acute hydrocephalus, and cerebral hemorrhage and cerebral infarction) are relatively rare in child patients. The most common systematic reasons of unconsciousness are intoxications, disorders in fluid balance such as dehydration caused by gastroenteritis, and metabolic and endocrinological diseases such as diabetic ketoacidosis. (Rantala 2016.)

In other studies, metabolic disorders, (central nervous system) infections, intoxications and status epilepticus are leading causes of unconsciousness as shown in table (TABLE 6) Causes of unconsciousness (non-traumatic). The results of three different studies are shown in the

table. Study 1 and study 2 are adapted from Karimi et al (2013) and study 3 from Fouad et al. (2009). All of the three studies were taken in different hospitals. In addition, the patients were from different age-groups which had an impact in the results. (Fouad et al. 2009; Karimi et al. 2013.) For example, the most common reason of unconsciousness among under 2 years old patients was infectious causes while toxic causes were the leading cause of unconsciousness in 2-6 years old patients in a research adapted from Karimi et al (2013). Furthermore, the patients in study 1 suffered from loss of consciousness while in study 2 and study 3 the patients were in coma.

Head injuries are divided in two categories, external and internal head injuries. Around 10% of concussions lead to loss of consciousness. (Pennington 2010.) Head trauma can be severe especially for children under 2 years old and children who fall from one meter or higher altitude (Karimi et al 2013.) Head injuries are more common for males than females. Falls are the most common cause of head trauma for children under 14 years old while motor vehicle injuries are the most common cause of head trauma among children aged 15 years or older. Other causes are sports and recreation, assault, and firearms. (Thurman 2014.) According to Rantala (2016), different kind of brain injuries are the second most common cause of unconsciousness among child patients. It is always essential to look for external injuries since the cause can be child abuse (Rantala 2016.) If the cause is traumatic, it is essential to examine intracranial hemorrhage and microscopic injuries (Karimi et al. 2013.)

Prognosis of an unconsciousness patient is depending on the underlying condition. Mortality rate is higher in children aged under 3 years old. In addition, poor GCS at admission decreases the chances of surviving. (Fouad et al. 2009.) According to Karimi et al. (2013), if the patient is not responsive to pain stimuli within 3 days the prognosis is very weak. Furthermore, when the patient is unconscious for 2-4 weeks it leads to vegetative life. Vegetative state is when a patient has no longer awareness of oneself or the environment, or has no more voluntary motor responsiveness. (Calabro et al. 2016.) This stage will be irreversible if it has lasted over 3 months for non-traumatic and over one year for traumatic patients. (Karimi et al. 2013.)

The cause of unconsciousness is directly proportional to mortality rate. In Fouads et al. (2009) study the mortality rate was 50%. However, they mentioned mortality rates from other studies in other countries being 26.7%, 35% and 47.2%. (Fouad et al. 2009.) The cause of loss of consciousness has a significant role in the mortality rate. According to Karimi et al. (2013) the

mortality rates after different causes were as follows drowning 84%, infections 60%, metabolic disorders 27% and intoxications 2-3%.

5.2 Emergency care of an unconscious child patient

An unconscious patient cannot be contacted, he or she cannot be awoken and does not follow the given instructions. Unconsciousness is caused by either hemispheric dysfunction or the so-called reticular activation system disorder of the brainstem. There are various causes and several of them are life-threatening. Therefore, the diagnosis and treatment of unconsciousness are progressing simultaneously. Immediate treatment measures buy time for the cause of unconsciousness to be resolved and treatment under it is initiated. (Kallela & Lindsberg 2016.)

It is essential to find out what has happened if a child loses consciousness. When professional help arrives to the place, it is essential to find out patient history if a child is found unconscious since some underlying conditions such as diabetes, epilepsy and brain tumor can cause unconsciousness. Sort out if the cause is traumatic or non-traumatic. The second step is to assess the vital signs and establishing ABCD-protocol. (Karimi et al. 2013.)

The goal of ABCDE-protocol is to administer life-saving care and achieve more time to investigate the underlying diagnosis and treatment. It should be used if critical illness or injury is suspected or evident. First, the safety should be ensured. General appearance is observed. For example, snoring is common sign of partial airway obstruction if the patient is unconscious. (Thim, Krarup, Grove, Rohde & Løfgren 2012.) Stabilization of airways, breathing and circulation is the primary care of unconscious patient. In addition, prevention of aspiration is essential. Furthermore, possible hypoglycemia is excluded and treated. The diagnosis and treatment of unconsciousness are progressing simultaneously. (Kallela & Lindsberg 2016.)

ABCDE stands for airways, breathing, circulation, disability and exposure. Life-saving treatment is given when the condition of the patient is critical and the underlying condition has not been diagnosed. This prevents the patient's condition deteriorating and gives the nursing staff time to find out the underlying cause. The purpose of the ABCDE protocol is to quickly detect and treat the life-threatening problems. In addition, it helps to find out if there is need for

additional help and it improves team effort. ABCDE approach should be repeated until patient status is stable and repeated if patient status deteriorates again. (Thimet al. 2012.)

Airway obstruction can be partial or complete and is commonly caused by decreased level of consciousness. The signs of airway obstruction are changed voice, noisy breathing and increased breathing effort if the obstruction is partial, and no respiration if the obstruction is complete. The airways are opened by head tilt and chin lift. If there is any foreign objects in the airways they should be removed. Furthermore, secretions such as vomit or blood are suctioned from the airways. If the patient is only responding to pain or is unresponsive, he or she should be placed to recovery position on the side. In some cases when GCS is under 8, intubation is required. (Thim et al. 2012.)

After open airways are ensured, breathing is observed by watching, listening and feeling. The way of breathing, chest movements, use of auxiliary muscles, respiratory rate, and breathing sounds while inhaling and exhaling are observed. (Virta-Helenius 2013.) Blue tinge of the skin, enlarged neck veins, and lateralization of the trachea can be recognized. Lung auscultation should be performed to investigate the condition of the lungs and a pulse oximeter applied to determine the oxygen content of the blood. If breathing is inadequate, assisted ventilation should be performed. (Thim et al. 2012.) The smell of breathing can reveal the underlying condition of the patient: the smell of acetone refers to diabetic ketoacidosis and urine refers to uremia. In addition, mucus accumulation in the throat and the upper part of the trachea should be observed. (Virta-Helenius 2013.)

Heart rate and capillary refill time are observed when assessing circulation. Examination of the skin can show problems in the circulation, for example color changes and sweating are signs of decreased perfusion. Heart auscultation and measuring blood pressure are essential when observing circulation. In addition, any bleedings should be stopped as soon as possible. By placing the patient in supine position and elevating the patient's legs the effects of hypovolemia can be relieved. In order to give saline infusion an intravenous access should be obtained as soon as possible. (Thim et al. 2012.) It is essential to notice that there are special features in the functioning of the infant heart and circulatory system, while blood circulation of a healthy school-age child is not significantly different from a young adult. (Puustinen 2013.)

After airways, breathing and circulation are stabilized, AVPU method or GCS can be used to assess the level of consciousness. In this stage the alertness is observed: whether the patient is responsive to voice or pain, or is unresponsive. In addition, limb movements, pupillary light reflexes are tested and blood glucose level is measured. Low blood glucose level can be corrected orally or intravenously. (Thim et al. 2012.) It is essential to measure blood glucose level from children as hypoglycemia is easily generated due to small glycogen stores. (Puustinen 2013.) In addition, any leads that could explain the condition of the patient are followed. Any signs of for example trauma, bleeding, skin reaction or needle marks are observed. Body temperature should be measured and clothes removed to reveal any hidden clues and enable whole body physical examination. (Thim et al. 2012.)

5.2.1 Pediatric resuscitation

It is essential to remember that pediatric diseases and pathophysiological responses are usually different from adult ones. The most common causes of lifelessness in children are respiratory failure and oxygen deficiency due to various causes such as injury, drowning or poisoning. However, the incidence of critical illness in children is clearly less common than in adults. In children, the prognosis of outpatient resuscitation is very poor, and therefore, the identification and timely detection of circulatory or respiratory symptoms may be a life saving measure for the child. If a child is lifeless, it is essential to begin cardiopulmonary-resuscitation immediately. Cardiac defibrillator demanding cause of lifelessness is rare in children. The most common initial rhythm in children is asystole or PEA. Neonatal resuscitation differs from the guidelines set to pediatric resuscitation, adolescent resuscitation follows the same guidelines as for adults. However, lay people can use the same guidelines as for adults in pediatric resuscitation. (Castren, Nurmi, Heinäaho, Hoppu, Ikola, Myllyrinne, Peltoniemi-Ailisto., Skrifvars, Vaahersalo, & Kukkonen-Harjula, 2016.)

It is important to identify the reason for the child's inattention quickly, so consulting the potential witnesses is important. Signs that suggests respiratory failure are age-related abnormal respiratory rate, increased breathing, abnormal breathing sounds, decreased chest movement and cyanosis. Tachycardia, hypotension, impaired peripheral blood flow, and weak or missing peripheral pulses refer to circulatory depression. It is hard to estimate pulse therefore, a maximum of 10 seconds is used to evaluate the circulation, and the overall assessment gives

a better picture of the situation. Infant pulse is palpated inside of the upper arm or groin, and more than 1 year-old child's heart rate is palpated from the carotid artery or groin. (Castren et al. 2016.)

Resuscitation is started if a child is lifeless and does not react to speech or touch and does not breathe normally. Airways are opened by turning the head backwards and lifting the jaw up. Resuscitation is started by blowing five times, followed by initiation of cardiopulmonary-resuscitation with a ratio of 15 compressions and 2 blows. The pressing frequency is 100-120 presses per minute. The most common cause of heart stop in children is lack of oxygen, and even a brief resuscitation may help to trigger the heart again. Therefore, if there is only one person at place, resuscitation must be started immediately for one minute before calling for help. If there are more people at the place, alerting the help and initiating CPR will occur simultaneously. (Castren et al. 2016.)

Intubation is the surest and safest way to insure airways, protect from aspiration, and provide optimum ventilation. According to Karimi (et al. 2013), if the GCS is equal or less than 8, unconscious child should be intubated. However, if an intubation trained person is not available, supraglottic instruments such as drain pipe or mask ventilation are used. Furthermore, if the need for ventilation support is short-term, mask ventilation is effective and safe. 100% oxygen is given during resuscitation. After the spontaneous circulation reversal, additional oxygen is titrated in accordance with oxygen saturation with the aim of 94-98%. (Castren et al. 2016.)

Defibrillator rhythms include ventricular fibrillation and tachycardia, which may occur due to a sudden lifelessness in children or adolescents with cardiovascular disease. In children, 4 J/kg energy is used regardless of waveform of the defibrillator. Opening the intravenous connection or insertion of intraocular sebum should be made quickly at the start of the resuscitation in order to administrate the necessary medications, fluids and blood products. Administration of drugs into the trachea is not recommended during resuscitation. Adrenaline (0,1mg/ml, 10µg/kg) is given every 3-5 minutes during resuscitation. (Castren et al. 2016.) The ABCDE approach is recommended as the first step in post resuscitation care upon the return of spontaneous circulation. (Thim et al. 2012.)

Parents should be given the opportunity to be present in the resuscitation situation. Nursing staff should face the parents with empathy and tell them what is happening during resuscitation. If necessary, parents should be directed to another room if they are preventing the resuscitation. Leader of the resuscitation makes the decision when it is time to terminate the CPR. A debriefing is arranged for the resuscitation team after the resuscitation. (Castren et al. 2016.)

5.3 Monitoring and care of unconscious child patient

The aim of the treatment of an unconscious patient is to maintain and support the normal functions of the body and to prevent complications. In addition, creating a safe environment and supporting the relatives are an important part of nursing an unconscious child patient. (Virta-Helenius 2013.) As the condition of the patient is stable, clearing the cause of the unconsciousness begins by clinical examinations, clarifying possible life-threatening condition and sorting out the neurological status. The eyewitness report on the onset of unconsciousness and the preceding symptoms is crucial. Likewise, information on past diseases and medication are in important role while making diagnoses. (Kallela & Lindberg 2016.) Preliminary treatment of unconscious patient is supportive. Aim is to maintain adequate brain perfusion by proper oxygenation, fluid and electrolyte administration and monitoring vital signs. (Karimi et. al. 2013.)

Temperature. Infections are treatable and common causes of unconsciousness in child patients. Therefore, it is essential to consider this as a causal agent especially if the patient is having fever. Infections, inflammatory disorders, heatstroke-induced hyperthermia, malignant neuroleptic syndrome, status epilepticus, hyperthyroidism and some toxic poisoning with anticholinergic agents are causes of unconsciousness that occur with fever. (Karimi et al. 2013.) The aim is to keep the temperature below 37 degrees, as low heat protects the brain from ischemia. (Virta-Helenius 2013.) Especially in small children, infectious causes, some drug poisoning and hypothyroidism may cause hypothermia. (Karimi et al. 2013.) It is essential to remember that children's thermoregulation is different from adults due to large skin surface. Children cool down easily and sweating is inadequate. Prevention of hypothermia is important and it is essential to cover the head in order to prevent heat loss especially with small children. (Puustinen 2013.)

Blood pressure and heart rate. It is essential to monitor heart rate and blood pressure of an unconscious child patient. Tachycardia occurs in patients with fever, different causes of shock and non-convulsive status epilepticus while bradycardia occurs in cases of hypoxemia and increased intracranial pressure. (Karimi et al. 2013.) Examination of the skin can give clues of circulatory disorders such as color changes, sweating and reduced level of consciousness are signs of reduced perfusion. Hypotension is an important adverse clinical sign, (Thim et al. 2012.) and indicates shock, acute adrenal insufficiency, or toxicity. In order to maintain adequate brain circulation, systolic blood pressure must be above 90. (Virta-Helenius 2013.) Pain increases heart rate and blood pressure. (Keituri & Laine 2012.) In addition, hypertension can be seen with increased intracranial pressure, renal failure or poisoning, and can alone cause unconsciousness. (Karimi et al. 2013.) Furthermore, the age of the child should be taken into account when examining circulation. There are special features in the activity of heart and circulatory system if the patient is newborn baby, whereas circulation of a healthy school-age child is not significantly different from young adults. (Puustinen 2013.)

Number and pattern of breathing. Number and pattern of breathing should be observed while monitoring unconscious patient. For example, if the cause of unconsciousness is infectious such as sepsis or metabolic disorder, tachypnea can be seen, while hyperventilation occurs if the child has brain edema or diabetic ketoacidosis. (Karimi et al. 2013.) When monitoring breathing, it should be noted that child's pulmonary function differs from adults, for example newborn baby has double oxygen consumption and respiratory rate compared to adults. Respiratory reserves are low, which causes saturation to decline rapidly. (Puustinen 2013.) If necessary, oxygenation should be ensured by oxygen mustache, oxygen mask, drainage tube or intubation. (Virta-Helenius 2013.) In order to maintain appropriate airway and prevent aspiration, the unconscious child must be intubated if GCS is equal or less than 8. (Karimi et al. 2013.) It is essential to keep the respiratory tract moist and clean, and suck any secretions if necessary. Position therapy facilitates the inhalation of an unconscious patient, as well as removal of secretions from the respiratory tract. (Virta-Helenius 2013.)

Skin and mucosa. Skin color, heat and condition should be observed if the patient is unconscious since it can reveal the cause of unconsciousness. Cyanosis is a sign of hypoxia, pink color of the skin refers to carbon monoxide poisoning and jaundice and pallor infer to anemia. Bleeding lesions refer to serious infections, especially septicemia. If there is any

bruising on the skin, around the eyes, on the mastoid area, or rhinorrhea/ otorrhea, head trauma should be considered. (Karimi et al. 2013.)

When a child is unconscious, it is important to take care of personal hygiene and skin care. It is important to take care of the cleanliness and freshness of the mouth as well as lip augmentation, and protect the eyes from drying and infections. Especially if unconsciousness lasts a long time, it is essential to provide position therapy and passive movement therapy in order to avoid pressure sources. Compression stockings are important for the prevention of venous thrombosis. In addition, fever should be reduced by lowering the room temperature to 18-20 Celsius degrees, reducing clothes and covering, and if necessary administering anti-inflammatory drugs. (Virta-Helenius 2013.)

Fluid balance and secretion. According to Karimi et al (2013), “electrolyte disorders in children may cause coma or be its consequences”. Fluid balance must be calculated at least once a day. While calculating fluid balance the following matters should be noted: fever, vomiting, and diarrhea. Administration of normal saline is recommended and glucose should be avoided. (Virta-Helenius 2013.) Physiological features should be taken into account when administering fluids and electrolytes to child patients. The relative proportion of fluid in the body is greater in children than in adults. Due to hormonal and neural regulation as well as kidney function are immature, and sodium loss disruption of fluid balance is more sensitive. In addition, hypoglycemia is easily generated due to small glycogen stores. (Puustinen 2013.) Nutrition should be given gradually through nasogastric tube. In addition, secretion should be followed when a patient is unconscious by monitoring the quantity and quality of urine and stools throughout the day. (Virta-Helenius 2013.)

Neurological status. Approximately 60-70% of brain delivered causes of unconsciousness are systemic or diffuse brain-delivered causes such as metabolic, toxic, hypoxic or septic cause. In that case neurological local findings are missing and status is generally symmetrical. The following symptoms suspect that cause of unconsciousness is systemic or diffuse: confusion, drowsiness, myoclonic nodules, trembling of the hands, tremor. In the case of opioid poisoning, the pupils are punctate small. Clinical and laboratory examinations are the cornerstone of diagnostics. (Kallela & Lindsberg 2016.)

Brain CT is primary examination if the cause of unconsciousness is intracranial such as cerebral infarction, cerebral hemorrhage, tumor or abscess. The following symptoms suggest that the cause of unconsciousness is above the tentorium: dysphasia, hemiplegia, conjugated eye deviation, and a positive sign of Babinski on the hemiparesis side. If the cause is located under the tentorium, the following symptoms occur: nystagmus, difficulty swallowing, slurred speech, ataxia, hemiplegia, eye deviation on the paralysis side, quadriplegia, positive Babinski sign on both sides, occipital headache, and vomiting. (Kallela & Lindsberg 2016.)

Other neurological causes of unconsciousness include central nervous system infections and epileptic seizures. Fever, neck stiffness and confusion before unconsciousness are symptoms that refer to central nervous system infection (meningitis or encephalitis). In this case lumbar puncture and blood culture are taken. If the suspected cause is epileptic or other convulsive seizure or post-space, eyewitness observations and EEG are in important role when making the diagnosis. In addition earlier history of seizures and bite marks in the tongue suggest that the cause of unconsciousness is a seizure. (Kallela & Lindsberg 2016.)

Pain management. Childs' age should be considered when managing the pain since children experience the pain differently in different ages. The smaller the child is the more alert one should be when estimating the pain. Some factors such as position, expressions, noises, skin color and sweating, breathing and sensitivity when touched may be signs of pain. Other signs of pain are increased heart rate, blood pressure and respiratory rate. (Keituri & Laine 2012.)

The route of administration and the mode of administration are selected as appropriate, however, per oral is the preferred mode of administration. Short-acting drugs are given for short-term pain, and long-acting medications or continuous infusion are given to long-term pain. NSAIDs and paracetamol are used for mild pain, if the pain is severe, also opioids are given. Paracetamol is suitable for all ages, NSAIDs for older than 3 months old children. (Vilo, Kokki & Kröger 2016.)

Communication and family oriented care. When communicating to the patient, it is essential to remember that hearing is the last sense that an unconscious patient has. The patient may hear and remember things therefore, it is important to maintain and strengthen patient awareness of the environment and his/herself. When communicating with an unconscious patient, the patient should be referred by his or her name and the speech should be normal,

clear and short phrases should be used. Touch and verbal communication are keystones while providing good care to the patient. In addition, inclusion of relatives is essential part of good communication especially in the case of pediatric patients. If the parents do not have an opportunity to be with their child around the clock, it is important to allow visiting times. (Virta-Helenius 2013.)

It is important to establish a confidential interaction, to listen to the relatives and their desires, and to be present and maintain hope. Parents should be notified if any changes happen in their child's condition or treatment. Information should be honest and intelligible. Parents should be encouraged to communicate and touch their child. They should be guided on how to participate in care of their child such as movement therapy, skin care and massage. It is important to support coping of the relatives by offering crises or spiritual help, and reminding them of everyday activities such as eating and getting enough sleep. If necessary, visiting hours should be limited in order to maintain parents' well-being. (Virta-Helenius 2013.)

Other considerations. Funduscopy is essential if a child is unconscious. "Shaken baby syndrome" can be indicated in infants if papilledema and retinal hemorrhages occur. It is important to note that meningeal irritation such as neck stiffness can be absent if a child is in deep coma or has intracranial infection. Therefore, even if these symptoms are absent, meningitis cannot be excluded before further examinations. (Karimi et al. 2013.) Facial expressions, restlessness, sweatiness, increased breathing rate and elevated blood pressure and pulse may be signs of pain. In addition, the risk of aspiration and rise in intracranial pressure are present, if the patient is lying horizontally, therefore headboard should be elevated to 30-degree angle from the floor. (Virta-Helenius 2013.)

Laboratory tests and radiological examination. Certain laboratory tests are mandatory if a child is unconscious. If the cause of unconsciousness does not have clear indications in patient history or physical examinations, the following basic tests are needed in order to specify the cause of unconsciousness: blood sugar and arterial blood gas, electrolytes (serum Na, K, Cl and Ca), creatinine and urea, peripheral blood cell count and differentials, blood cultures, urinalysis testing, liver function tests, and serum ammonia. In addition, it is advisable to retain a sample of plasma and urine for possible further examinations that are needed. (Karimi et al. 2013.)

Both hypoglycemia and hyperglycemia with ketoacidosis are common treatable causes of unconsciousness in pediatric patients. Therefore, it is essential to monitor blood sugar levels and offer treatment if needed since prolongation of treatment may cause irreversible damage in the brain. (Karimi et al. 2013.) Target value of blood glucose is under 10mmol/l and higher value may cause cerebral edema. (Virta-Helenius 2013.)

Other test that might be required are chest x-ray, neuroimaging, lumbar puncture, EEG and ECG. Chest x-ray is needed especially after intubation and if respiratory tract involvement or aspiration pneumonia are suspected. If the x-ray is abnormal the cause can be for example tuberculosis, pneumonia, or septic pulmonary emboli. Brain CT-scan is primary neurological examination in case of head trauma or other neurological cause of unconsciousness such as brain tumor, brain herniation or cerebral edema is suspected. MRI can be taken as a further examination if needed. If an infection in the brain such as meningitis is suspected lumbar puncture should be taken. However, if GCS is 12 or less, it is advisable to take brain CT-scan first in order to rule out the possibility of brain herniation. (Karimi et al. 2013.) No convulsive epilepsy is suspected if the patient has had convulsion before loss of unconsciousness, in this case EEG should be taken. In addition, EEG may give an indication of metabolic disorder such as hepatic coma or infection such as herpes encephalitis. (Kallela & Lindsberg 2016.) Furthermore, EEG is helpful in other areas such as slow rhythm and asymmetry. (Karimi et al. 2013.)

5.3.1 Neurological assessment

The aim of neurological assessment is to locate or exclude the brain delivered cause of unconsciousness. (Kallela & Lindsberg 2016.) When a child is unconscious, the level of consciousness should be recorded at regular intervals and in case there is any change in the level of consciousness. If the pupils are expanding, unresponsive to light or asymmetrical, it suggests a deterioration in the condition. (Virta-Helenius 2013.) Certain causes of unconsciousness lead to death in short order if they are untreated. Therefore, clinical examinations aim at the immediate detection or exclusion of these causes. (Kallela & Lindsberg 2016.)

Neurological assessment of an unconscious pediatric patient includes the following three examinations: level of consciousness, evaluation of the motor system and determination of brain stem reflexes. Evaluation of patient's motor system includes muscle tone, spontaneous or stimuli triggered movements, and deep tendon reflexes. Brain stem reflexes cover pupillary reflex, corneal reflex and extra-ocular reflex. GCS or PGCS are frequently used systematic examinations when assessing the child's level of consciousness and figuring out the prognosis. (Karimi et al. 2013.) In addition, it is essential to observe any side differences in spontaneous movements, pain stimuli, limb tonus, reflexes, and Babinski sign. (Kallela & Lindsberg 2016.)

There are three rating criteria assessed in GCS: eye opening, motor response to stimuli and audio response to stimuli. (Kallela & Lindsberg 2016; Karimi et al. 2013.) Eye opening is scored from 4 to 1 in GCS (spontaneous - in response to commands - to painful stimuli - no response) and PGCS (spontaneous - to sound - to painful stimuli - no response), 1 being the lowest score and 4 the highest score. Furthermore, audio responses to stimuli are scored from 5 to 1 as follows GCS (oriented - confusion, disoriented - inappropriate words - incomprehensible sounds - no sound) and PGCS (produces sound appropriate to age - crying and restlessness - cries in response to painful stimuli - sighs in response to painful stimuli - no sound). Moreover, motor responses to stimuli are scored from 6 to 1 in GCS (obey the commands - localize in response to painful stimuli - withdraw in response to the painful stimuli - abnormal flexion in response to painful stimuli (decorticate) - abnormal extension in response to painful stimuli (decerebrate) - no response) and PGCS (spontaneous movements - drag in response to tactile stimuli - withdraw in response to the painful stimuli - abnormal flexion in response to painful stimuli - abnormal extension in response to painful stimuli - no response). (Karimi et al. 2013.)

PGCS is often used with children under 2 years old, and GCS is mostly used with older children. In GCS the score varies from 3 to 15. Score equal and over 13 refers to mild brain disorder, if the score is between 9 and 12 it suggests moderate disorder, and if one scores equal to or below 8 that is severe brain disorder. (Karimi et al. 2013.) When testing the eye opening, one should shout in the ear if necessary. In addition, when testing the best motor response, pain response is tested if necessary (suborbital, cuticle, sternum pain etc.). These results are recorded in the patient report. (Kallela & Lindsberg 2016.)

Brain centers that regulate consciousness and alertness are located in the brain close to the part that regulates eye motor function. Therefore, it is essential to examine the eyes when

examining an unconscious patient. The size, symmetry and light reactions of pupils, lumps, and eye movements (resting position, spontaneous movements) are tested when examining eye motor function. In addition, Doll's eye reflex and oculovestibular reflex are examined. (Kallela & Lindsberg 2016.) When moving the head to one side the eyes should move to the opposite side (Doll's eye reflex), if this is absent it suggests brain stem damage (Kallela & Lindsberg 2016.), lesion of pons, the nerves involved in eye movements, metabolic deep coma or drug poisoning. (Karimi et al. 2013.) Oculovestibular reflex is tested by rotating the head fast sideways on both sides, and eye should stay fastened at the same point all the time. (Kallela & Lindsberg 2016.)

6 DISCUSSION AND CONCLUSION

Research process and findings, and ethical considerations are discussed in this section. Finally, a conclusion is made and further study needs are proposed.

6.1. Methodology considerations and limitations

The aim of the study was to introduce the most common causes of unconsciousness in child patients and to demonstrate how to take care of an unconscious child patient. In addition, the aim was to develop researcher's own theoretical knowledge and professional skills in practical work. Literature review was conducted as a method in this research. Articles in both English and Finnish were used. Data was collected from reliable sources and databases by using keywords related to the topic. Both professional literature from school library and scientific articles from different databases were utilized in the theoretical framework. Scientific databases were used when collecting the material to research findings. The articles were printed out or the main points of the articles were written down in research diary. When the material was collected, all the articles that were related to the topic were saved in a file in order to come back to them later on during the research process. Later on some of these articles were included in the study, and rest of them were excluded.

A lot of knowledge could be found on unconsciousness and taking care of unconscious patients. However, relatively few articles were focusing on taking care of an unconscious child patient. For example, psychological causes of unconsciousness came up in the theoretical framework but did not occur in the findings. However, psychological causes of unconsciousness were rare, and this could explain why it did not occur in the findings. Furthermore, there are special features that must be taken into account when taking care of an unconscious child patient, such as not all the diseases occur and show same symptoms as in adults. It is essential that there are studies on special features of pediatric nursing and how it affects nursing care in different areas.

Almost all of the studies included in this research were literature reviews, and it was hard to find any studies that utilized any other research method. This may limit the results since

mainly one method is covered. In addition, most of the research studies were written from the medicinal point of view. The subject is medical, and therefore, it is essential to understand the medical point of view. However, it is beneficial to research the same subject from different research fields in order to get more overall picture of the phenomenon.

6.2 Ethical considerations and validity

Ethical questions attached to research and information are important. The field of research ethics is extensive, including plagiarism and source criticism, the role of researcher and its requirements, and netiquette. Excessive use of citations is an indication that the researcher is well familiar with the research field and therefore, it does not diminish the value of the research. However, it is important to know how to make the citations correctly and respect the moral rights of the author. In addition, researcher must not give a misleading picture of the original text. Researcher should always when possible favor the original source as in a secondary source someone has interpreted, summarized or rewritten the original text. However, the data is renewed all the time and in some cases it can be more relevant to use the secondary source in order to get a fresher view point of the phenomenon. In this case only authorized secondary sources should be used. As the meaning of a translation changes in case there is no full equivalence between languages, a translated text is always an issue and a risk. (Mäkinen 2005.)

Providing reliable information about the research phenomenon is the main task of a researcher. In order to provide valid information, the researcher must have a critical approach towards the phenomenon and have genuine interest in gaining new information about the phenomenon. Researcher's dedication to his own research field, motivation to own work, as well as following the development of one's own field increase the validity of the gained information in the research. Researcher must not confine himself to the existing information but rather, correct and develop the existing knowledge. In addition, the researcher must be honest about the results in order to develop his own professional competency. (Mäkinen 2005.)

6.3 Discussion of findings

The research indicated that there was no single reason that was the most common cause of unconsciousness in child patients but there are various different causes that can cause unconsciousness, and some of them are more common than the others. These causes can be divided in traumatic and non-traumatic causes, and they are either systematic or brain-delivered. Childs' age and geographical location where the study was taken were some of the elements that triggered to the outcome in the studies that were used in this research. For example, in Africa infections could be more common causes of unconsciousness due to malaria, simultaneously in Finland hypo- and hyperglycemia due to high rates of diabetes. In addition, teenagers are more prone to accidents than younger children and therefore, traumatic causes of unconsciousness could be more common in older children than younger ones. However, certain causes of unconsciousness came up as leading causes such as status epilepticus, intoxications, metabolic disorders (especially hypo- and hyperglycemia), and infections.

Both theoretical framework and study findings suggested that making initial assessment and following the ABCDE-protocol is essential when facing an unconscious child patient. Making the diagnosis and administering treatment should be done simultaneously step by step including ensuring the airways, breathing and circulation, examining consciousness level and possible hypoglycemia, taking laboratory tests and radiological examinations, interviewing eyewitnesses and taking patient history on possible diseases and medication, pain management, and observing the environment. Other important factors to remember when facing an unconscious child patient that came up in the research were the age, anatomical and physiological changes caused by patients' age, and family centered care.

One of the study aims was to develop researcher's own theoretical knowledge and professional skills in practical work. The researcher strengthened previous knowledge and gained new knowledge on the research question during the research process especially about the anatomical special features of taking care of a child patient. Researcher feels more confident to face unconscious child patients at work after conducting this research. During the research process the researcher was working in pediatric ward, and was able to apply the knowledge in clinical work for example by making neurological assessment on a patient.

Nurses' role in clinical work when taking care of an unconscious child patient is multi-dimensional, nurses are a part of a multi-professional team. Nurse observes the unconscious child patient and reports any changes happening in the child's condition to the doctor. In addition, documentation of the condition and any changes in it is an important part of nurses' duties, for example, GCS is followed and documented on a regular basis. Furthermore, nurses assist doctors in different procedures such as taking lumbar punctions, and implement some minor examinations such as taking blood or urine tests. It is essential that nurses know the special features of pediatric nursing such as vital functions and what to observe when a child is unconscious in order to provide as good care as possible. Moreover, nurses are responsible for implementing proper pain management and other medication according to doctors' prescriptions.

The cornerstone in nursing a child patient is creating safe environment and supporting the relatives. Nurses take care of good basic care of the child and support the parents. Good hygiene is important since it can hinder infections from spreading. Nurses take care of personal hygiene, wound care, position care, and passive movement rehabilitation of the child. In addition, nurses guide the parents to touch and talk to their unconscious child. Presence and appreciation, support, honesty and empathy are important when facing the parents. Nurses share information between parents and doctors, and fulfil parents' wishes as well as they can. Moreover, nurses take care of the parents by reminding them of the everyday activities such as eating and sleeping.

The researcher did not succeed in fulfilling the thesis plan entirely since it took more time to make the research than originally planned due to for example technical issues and exchange studies. In addition, researcher's native language is not English and therefore, more time was spent in writing and translating the text than if the researcher would have written it in her native language.

6.4 Conclusion

The results are beneficial in everyday life especially in pediatric wards and emergency care unit. In addition, the results can be applied to adult nursing. The topic is always current since any health care professional may face an unconscious patient despite the working

environment. It is important that any health care professional facing unconscious child patient is able to provide necessary and effective treatment. During the research process the researcher was working in pediatric ward. One important element that occurred at the working place in daily bases and came up in the research was family centered care. Especially, for those parents who had a child with severe and/or long-term illness confidence and honesty based relationship was important.

It is essential that parents and anyone working with children have the knowledge and skills how to act in an emergency situation where a child loses consciousness. Health care professionals should educate themselves and update their knowledge and skills all the time. The researcher has further study proposals as follows: 1. A research on knowledge, skills and preparedness the nurses have on facing an unconscious child patient in pediatric ward and/ or emergency care unit. 2. An education for non-healthcare professionals (e.g. at school, daycare, hobbies, parents) on how to act if a child loses consciousness.

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APPENDIX

APPENDIX 1. Summary of the articles

Authors & title of the article	Aim of the article	Method	Main results
Karimi, A., Fahimzad, S. A. & Ghanaie, R. M. Management of a Child With Decreased Level of Consciousness	The article describes the history taking, and physical and neurologic exams the affected child should be assessed with and explains the potential etiologies of a decreased level of consciousness.	Literature review	The cause of unconsciousness can be either traumatic or non-traumatic. Infectious causes of encephalopathy and the applied classification of them has been emphasized in the article.
Fouad, H., Haron, M., Halawa, E. & Tantawy, M. Etiology and Outcome of Non-Traumatic Coma in the Pediatric Emergency Department	To study the etiology and clinical profile of pediatric non-traumatic coma and to determine the clinical signs predictive of outcome.	Prospective descriptive study	Metabolic causes are the most common cause of non-traumatic coma in pediatrics. Simple clinical signs were good predictors of outcomes.

<p>Thim, T., Krarup, N.H.V., Grove, E. L., Rohde, C. V. & Løfgren, B. Initial assessment and treatment with the Airway, Breathing, Circulation, Disability, Exposure (ABCDE) approach.</p>	<p>The article offers a practical how-to-do description of the ABCDE approach.</p>	<p>Literature review</p>	<p>The ABCDE approach is a strong clinical tool for the initial assessment and treatment of patients in acute medical and surgical emergencies. It aids in determine the seriousness of a condition and to prioritize initial clinical interventions.</p>
<p>Castren, M., Nurmi, J., Heinäaho, E., Hoppu, S., Ikola, K., Myllyrinne, K., Peltoniemi-Ailisto., O., Skrifvars, M., Vaahersalo, J. & Kukkonen-Harjula, K. Elvytyt</p>	<p>The aim of the recommendation is that each of the cardiac arrest patient gets a good resuscitation quickly and high-quality post-CPR care. In addition, the aim is to identify cases where a patient has a risk of cardiac arrest and respond to proactive symptoms early enough.</p>	<p>Literature review</p>	<p>The part where pediatric resuscitation recommendations were described was used in this research. Cardiopulmonary resuscitation, medication during resuscitation, post resuscitation care, and presence of the parents are covered in the recommendation.</p>

<p>Calabro, R. M., Milardi, D., Cacciola, A., Marra, A., Digangi, G., Casella, C., Manuli, A., De Luca, R., Silvestri, R. & Bramanti, P. Moving into the wide clinical spectrum of consciousness disorders: Pearls, perils and pitfalls.</p>	<p>The aim is to explore the wide spectrum of consciousness disorders and their clinical differential diagnoses, with particular regards to those with negative impact on patient and their caregiver quality of life.</p>	<p>Literature review</p>	<p>Disordered states of consciousness define a broad category encompassing a spectrum of cognitive dysfunction, whose differential diagnosis is still challenging, especially concerning the chronic state. Based on cognitive and motor skills of the patient, it is possible to show up a continuum from coma state to full recovery of consciousness. However, the evaluation of these patients is extremely difficult, and depends on subjective interpretations of the patient's behavior, either spontaneously or in response to any stimuli.</p>
<p>Kallela, M. & Lindsberg, P. Tajuton potilas</p>	<p>Describe causes of unconsciousness, and the stages of diagnosis and treatment of unconscious patient.</p>	<p>Literature review</p>	<p>Immediate actions taken if a patient loses consciousness, finding out the cause of unconsciousness, clinical examination, neurological examination, and life- threatening situations.</p>

<p>Virta-Helenius, M. Pitkään tajuttomana olevan potilaan hoito</p>	<p>Describe the care of a patient that is unconsciousness longer period of time.</p>	<p>Literature review</p>	<p>The purpose of the treatment is to maintain and support the normal functions of the body, prevent complications, create a safe environment for the patient, and support relatives.</p>
<p>Puustinen, M-L. Lapsen anatomiset ja fysiologiset erityispiirteet.</p>	<p>Describe the anatomical and physiological special features of the child.</p>	<p>Literature review</p>	<p>The article describes the specific features of the respiratory, circulatory, heat regulation, fluid balance, glucose metabolism and drug response of the child.</p>
<p>Pennington, N. Head Injuries in Children.</p>	<p>The aim is to find out strategies how head injuries at school could be avoided, and how to provide needed care and avoid negative outcomes if a head injury occurs at school.</p>	<p>Literature review</p>	<p>School nurses have a crucial role in preventions and treatment if a head injury occur at school. It is essential that school nurses have enough knowledge of management head injuries, including assessment and initial treatment, and follow-up care including communication and reporting of the injury. Head injury protocol is one strategy to ensure right treatment and avoid negative outcomes.</p>

<p>Thurman, D. J. The Epidemiology of Traumatic Brain Injury in Children and Youths: A Review of Research Since 1990</p>	<p>The aim, is to examine and summarize published evidence describing the epidemiology of traumatic brain injuries in children and youths.</p>	<p>Systematic literature review</p>	<p>The public health burden of brain injury is disproportionately high in children, especially adolescents. Epidemiologic studies published between 1978 and 1990 established that across all age groups, the incidence of hospitalized and fatal brain injuries consistently peaked among late adolescents. These studies also demonstrated that among children and youths, males had a higher risk of injury than females and that the leading causes of among children were related to motor vehicle and bicycle accidents, falls, and sports- or recreation-related impacts.</p>
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Keituri, T. & Laine, R. Lapsen kivun hoito.	The aim is to describe what to consider in pain management of children.	Literature review	When taking care of pain management of a child, the following aspects should be considered: age of the child (children experience pain differently at different age), observation of any signs of pain (such as expressions), child's own report of the pain and parents evaluation of the pain, examination, treatment and medication.
Hiippala, A. Lapsen ja nuoren tajunnanmenetys – tavallinen pyörtyminen vai jotakin vakavampaa?	The aim is to find out whether loss of consciousness in children is due to fainting or something more serious.	Literature review	Usually, the cause of unconsciousness in children is benign e.g. fainting, and one third of young adults have fainted at least once during their lifetime. However, the cause can be more serious such as cardiogenic, and can cause sudden death.
Vilo, S., Kokki, H. & Kröger, L. Kivunhoito ja sedaatio.	Describe safety medication and sedation in child patients.	Literature review	The route and mode of administration of medicines are chosen due to the situation. Per oral is primary way of medication. Paracetamol is suitable for children of all ages, NSAIDs for children over 3 months of age.

<p>Rantala, H. Tajuton lapsi.</p>	<p>The aim is to find out the most common causes of unconsciousness in child patients, and describe, how to make the right diagnosis and begin the treatment.</p>	<p>Literature review</p>	<p>The cause of unconsciousness is either brain-delivered or systematic. Usually, the anamnesis is clear since the symptoms lead to right diagnosis. However, sometimes doctors are misled due to e.g. child abuse, and making the diagnosis is harder.</p>
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