Discharge Plan for School-Aged Children having Bronchial Asthma

Thesis

Submitted for Partial Fulfillment of the Requirements for
Doctorate Degree in Pediatric Nursing

By

Eman Abd El-Naeem Monir
(B.Sc. Nursing Science), 1998
Faculty of Nursing, Cairo University
(M. Sc. Nursing, 2010)
Faculty of Nursing, Ain Shams University
Acting Director of Police Technical Institute of Nursing

Faculty of Nursing
Ain Shams University
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Under Supervision of

Prof. Dr. Iman Ibrahim Abd Al-Moneim

Professor of Pediatric Nursing & Vice Dean of Community Service and Environment Development Affairs

Faculty of Nursing – Ain Shams University

Assist. Prof. Madiha Amin Morsy

Assistant Professor of Pediatric Nursing Department

Faculty of Nursing – Ain Shams University

Faculty of Nursing
Ain Shams University

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Dedication

This work is gratefully dedicated to the soul of my Mother whom I always wished she could share this occasion with me and she was always supporting me in every step in my life.

Introduction

Asthma is a chronic inflammatory disease of the airways. It is the most common chronic disease of the childhood allover the world well as in Egypt. The chronic inflammation is associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning ***(British Guideline 2009; Global Strategy for Asthma Management & Prevention, 2010).***

Worldwide, asthma affects more than 300 million people, including more than 6 million children and some reports state that asthma prevalence increasing by 50% every decade ***(Braman & Anaya, 2007; Dougherty & Fahy, 2009; National Heart, Lung & Blood Institute [NHLBI], 2007)***.

In Egypt, the prevalence varies in different part of the world in Egypt. The prevalence of asthma among school children in the Nile Delta region was 7.7%. A positive family history of allergy and bad housing conditions were found as risk factors for asthma ***(Magdy et al., 2009)***.

Asthma affects children physically, psychologically and socially. The quality of life (QOL) is a subjective parameter that evaluates the impact of asthma on daily life of the child. Furthermore, bronchial asthma is a chronic disease, widely

recognized to cause severe QOL impairment in affected children ***(World Health Organization [WHO], 2004)***.

Discharge planning is a documentation form used when the child discharge from the hospital. It is a service provided before discharge and delineates plans recommended for future and care such as goals achieved progress attends toward unmet goals to perform health care managed ***(Al-Soreety, 2002)***. It is essential to teach pediatric patients how to monitor signs and symptoms, and take appropriate action. Patients who have a written asthma action plan and appropriate medication can often manage mild exacerbations at home ***(Ferdous et al., 2014)***.

Significance of the Study

The morbidity and mortality rate of asthma in childhood demonstrate an alarming increase the prevalence of asthma and its complication. Moreover, bronchial asthma has become a leading reason for pediatric hospital admission ***(Burns et al., 2010)***.

In Egypt, the prevalence varies in different part of the world in Egypt. The prevalence of asthma among school children in the Nile Delta region was 7.7%. A positive family history of allergy and bad housing conditions were found as risk factors for asthma ***(Magdy et al., 2009)***. Discharge planning will enhance children and their mothers understanding the disease process adherence to asthma regimen.

Aim of the Study

The study aims to assess effect of discharge plan on school aged children having bronchial asthma through:

1. Assessing the children's knowledge and practice regarding their illness and daily self care.
2. Assessing the common physical and psychological and social problems perceived by the children having asthma.
3. Construct and implement a discharge plan for children having asthma.
4. Evaluate the effect of discharge plan on children having asthma.

Research Hypothesis:

1. The researcher speculated that the children are lacking the satisfactory knowledge and practice about their illness.
2. There might be a relation between physical problems and their age.
3. The compliance of children having asthma to a discharge plan will be associated with adherence to treatment regimen.

Review of Literature

THE RESPIRATORY SYSTEM - DEVELOPMENT

The respiratory system (RS) develops from a median diverticulum of the foregut. Its lining epithelium is, therefore, of endodermal origin. The connective tissue, cartilage, and muscle, in relation to the organs of respiration, are derived from splanchnopleuric mesoderm. The larynx develops from the cranial most part of the respiratory diverticulum. The trachea develops from the part of the respiratory diverticulum, which lies between the point of its bifurcation and the larynx ***(Kolski, 2008)***. The two primary divisions of the respiratory diverticulum form the right and left principal bronchi. It soon subdivided in to lobar bronchi. The substance of the lungs is formed by further subdivisions of the lobar bronchi ***(Payne et al., 2008)***.

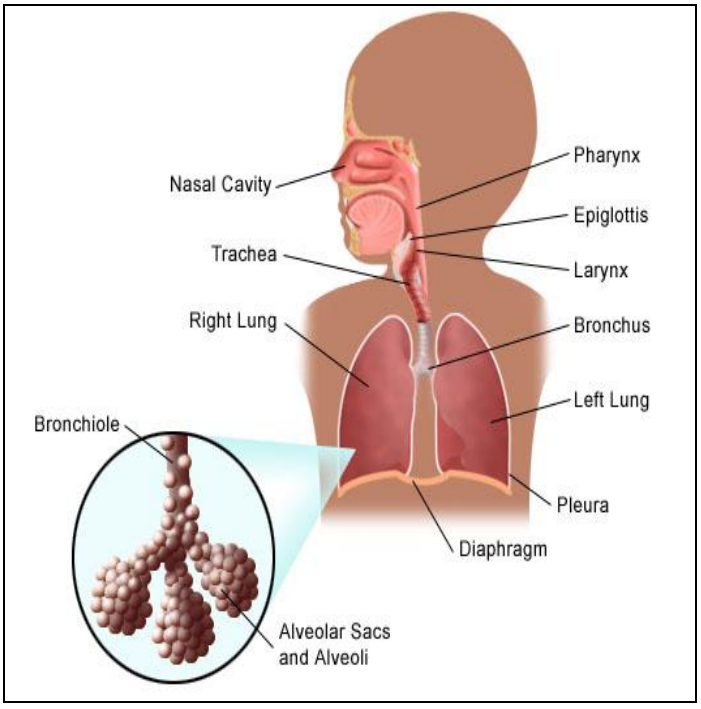
A respiratory system's function is to allow gas exchange. The space between the alveoli and the capillaries, the anatomy or structure of the exchange system, and the precise physiological uses of the exchanged gases vary depending on the organism. In humans and other mammals, for example, the anatomical features of the RS include airways, lungs, and the respiratory muscles. Molecules of oxygen (O_2) and carbon dioxide (CO_2) are passively exchanged, by diffusion, between the gaseous external

environment and the blood. This exchange process occurs in the alveolar region of the lungs ***(Martin et al., 2007)***.

ANATOMY OF RESPIRATORY SYSTEM

The respiratory system (RS) can be subdivided into an upper respiratory tract (URT) and a lower respiratory tract (LRT) based on anatomical features (Figure 1) ***(Medical Encyclopedia, 2014)***.

Figure (1): Anatomy of Respiratory System



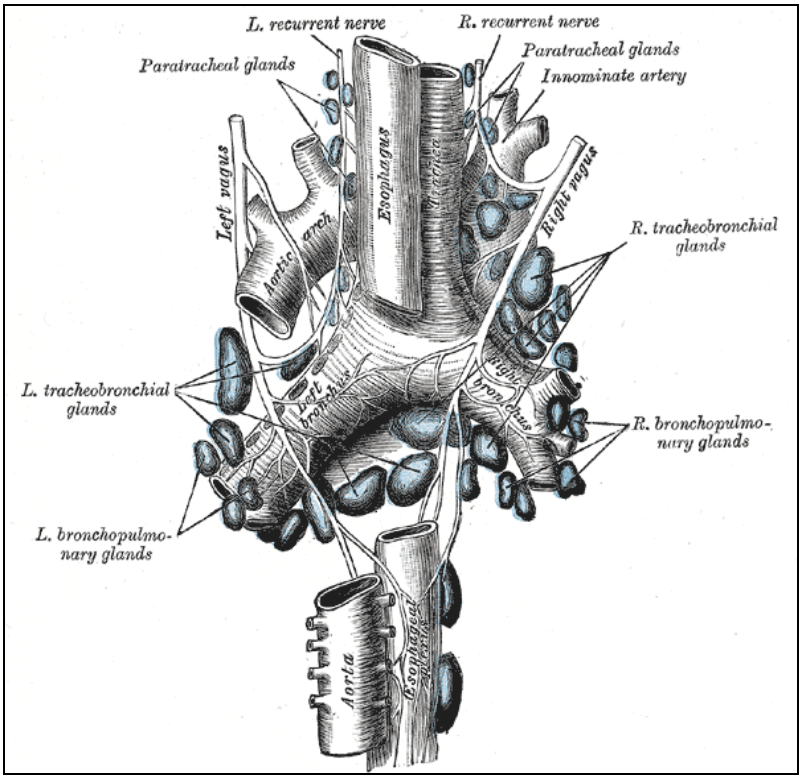
Medical Encyclopedia, (2014): *Respiratory System. Available at: http://medicalterms.info/anatomy/Respiratory-System/*

The upper respiratory tract (URT) includes the nasal passages, and the larynx, while the lower respiratory tract is comprised of the trachea, the primary bronchi and lungs. The Bronchi or Tubes are the two main tubes into the lung that divide from the trachea. The bronchi subdivide into the lobar bronchi three on the right side and two on the left. The Bronchioles are the smallest subdivisions of the bronchi, at the ends of which are the alveoli (plural of alveolus). The Alveoli are the very small air sacs that are the destination of inhaled air. The capillaries are blood vessels that are imbedded in the walls of the alveoli. The blood discharges CO2 into the alveoli and takes up O2 from the air in the alveoli ***(Gordon, 2008)***.

- **Blood supply:** The bronchi and parenchymal tissue of the lungs are supplied by bronchial arteries branches of the descending thoracic aorta. Bronchial veins, which also communicate with pulmonary veins, drain into the azygos and hemiazygos. The alveoli receive deoxygenated blood from terminal branches of the pulmonary artery (PA) and oxygenated blood returns via tributaries of the pulmonary veins (PVs). Two PVs return blood from each lung to the left atrium (LA) ***(Arnold et al., 2008)***.

- **Lymphatic drainage of the lungs:** Lymph returns from the periphery towards the hilar tracheobronchial groups (Figure 2) of nodes and from here to mediastinal lymph trunks ***(Payne et al., 2011)***.

Figure (2): Tracheobronchial Lymph Nodes

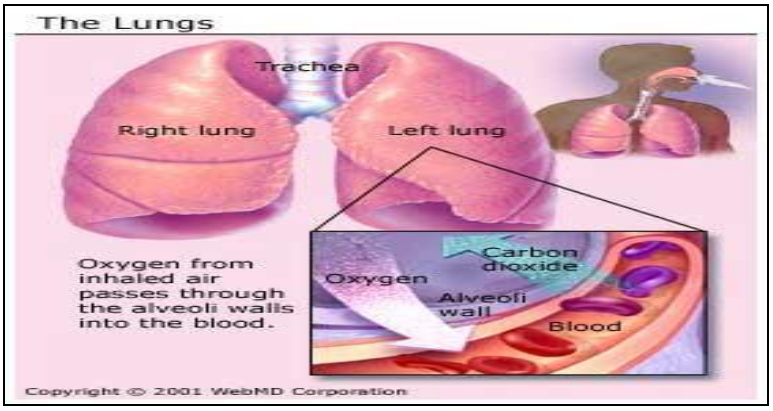


Encyclopedia (2014): *Tracheobronchial lymph nodes. Available at: http://en.wikipedia.org/wiki/Tracheobronchial_lymph_nodes*

- **Nerve supply of the lungs:** A pulmonary plexus is located at the root of each lung. The plexus is composed of sympathetic fibers and parasympathetic fibers. Efferent fibers from the plexus supply the bronchial musculature and afferents are received from the mucous membranes of bronchioles and from the alveoli ***(Arnold et al., 2008)***.

The respiratory system can also be divided into physiological, or functional, zones. These include the conducting zone, the transitional zone, and the respiratory zone (Figure 3) ***(Gordon, 2008)***.

Figure (3): Physiology of Respiratory System



WebMD (2001): *Stages of Small-Cell Lung Cancer. Available at: http://www.webmd.com/lung-cancer/guide/small-cell-lung-cancer*

PHYSIOLOGY OF RESPIRATORY SYSTEM

Ventilation:

Ventilation of the lungs is carried out by the muscles of respiration ***(Sutherland et al., 2011)***.

Control:

Ventilation occurs under the control of the autonomic nervous system from parts of the brain stem, the medulla oblongata and the pons. This area of the brain forms the respiration regulatory center, a series of interconnected brain

cells within the lower and middle brain stem which coordinate respiratory movements ***(Wolf et al., 2008)***. The sections are the pneumotaxic center, the apneustic center, and the dorsal and ventral respiratory groups. This section is especially sensitive during infancy, and the neurons can be destroyed if the infant is dropped and/or shaken violently. The result can be death due to "shaken baby syndrome ***(Holt et al., 2010)***.

Inhalation:

Inhalation is initiated by the diaphragm and supported by the external intercostals muscles. Normal resting respirations are 10 to 18 breaths per minute, with a time period of 2 seconds. During vigorous inhalation, or in approaching respiratory failure, accessory muscles of respiration are recruited for support. These consist of sternocleidomastoid, platysma, and the scalene muscles of the neck ***(Asarnoj et al., 2008).***

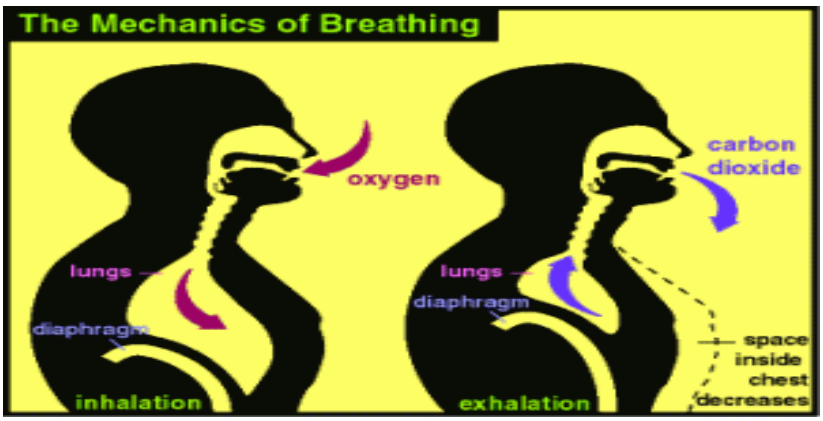
Under normal conditions, the diaphragm is the primary driver of inhalation. When the diaphragm contracts, the ribcage expands and the contents of the abdomen are moved downward. This results in a larger thoracic volume and negative (suction) pressure inside the thorax ***(Lodrup Carlsen et al., 2012)***. As the pressure in the chest falls, air moves into the conducting zone. Here, the air is filtered, warmed, and humidified as it flows to the lungs. During forced inhalation, as when taking a deep breath, the external

intercostals muscles and accessory muscles aid in further expanding the thoracic cavity ***(Pedroletti et al., 2009)***.

Exhalation:

Exhalation is generally a passive process; however, active or forced exhalation is achieved by the abdominal and the internal intercostals muscles. During this process air is forced or exhaled out. The lungs have a natural elasticity: as they recoil from the stretch of inhalation, air flows back out until the pressures in the chest and the atmosphere reach equilibrium. During forced exhalation, as when blowing out a candle, expiratory muscles including the abdominal muscles and internal intercostals muscles generate abdominal and thoracic pressure, which forces air out of the lungs ***(Bacharier et al., 2007)***. Figure (4) summarized the mechanisms of breathing.

Figure (4): The Mechanisms of Breathing



Jubel, M. (2014): The Art and Science of Breathing. Available at: http://changingbadhabits.com/2010/09/breathing-to-relieve-stress/

Circulation:

The right side of the heart pumps blood from the right ventricle through the pulmonary semilunar valve into the pulmonary trunk. The trunk branches into right and left pulmonary arteries to the pulmonary blood vessels (BVs). The vessels generally accompany the airways and also undergo numerous branching. Once the gas exchange process is complete in the pulmonary capillaries, blood is returned to the left side of the heart through four pulmonary veins, two from each side. The pulmonary circulation has a very low resistance, due to the short distance within the lungs, compared to the systemic circulation, and for this reason, all the pressures within the pulmonary BVs are normally low as compared to the pressure of the systemic circulation loop ***(Griffin, 2005; Brehm et al., 2009)***.

Gas exchange:

The major function of the respiratory system is gas exchange between the external environment and an organism's circulatory system. In humans and mammals, this exchange facilitates oxygenation of the blood with a concomitant removal of CO2 and other gaseous metabolic wastes from the circulation ***(Jaakkola & Gissler, 2007)***.

As gas exchange occurs, the acid-base balance of the body is maintained as part of homeostasis. If proper ventilation