AMERICAN ACADEMIC PUBLISHER

INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

ANATOMY, PHYSIOLOGY OF RESPIRATORY TRACT AND NURSING CARE

Yusupov Kamoliddin Sakhibjonovich
Bustan Technical School of Public Health Named after Abu Ali Ibn Sino

Abstract

This article examines the anatomical and physiological features of the respiratory system and nursing care principles for patients with respiratory disorders. The study analyzes current scientific literature on respiratory tract structure, functional mechanisms, and evidence-based nursing interventions.

Keywords

respiratory physiology, nursing care, respiratory disorders, clinical nursing practice, patient assessment, respiratory nursing interventions

Аннотация

В данной статье рассматриваются анатомические и физиологические особенности дыхательной системы и принципы сестринского ухода за пациентами с респираторными заболеваниями. Исследование анализирует современную научную литературу о структуре дыхательных путей, функциональных механизмах и научно обоснованных сестринских вмешательствах.

Ключевые слова

физиология дыхания, сестринский уход, респираторные заболевания, клиническая сестринская практика, оценка состояния пациента, сестринские вмешательства при респираторных заболеваниях

Annotatsiya

Ushbu maqolada nafas olish tizimining anatomik va fiziologik xususiyatlari hamda nafas yo'llari kasalliklari bilan og'rigan bemorlarni hamshiralik parvarishi tamoyillari ko'rib chiqiladi. Tadqiqot nafas yo'llarining tuzilishi, funksional mexanizmlari va dalillarga asoslangan hamshiralik aralashuvlari bo'yicha zamonaviy ilmiy adabiyotlarni tahlil qiladi.

Kalit so'zlar

nafas olish fiziologiyasi, hamshiralik parvarishi, nafas yo'llari kasalliklari, klinik hamshiralik amaliyoti, bemorni baholash, nafas yo'llari bo'yicha hamshiralik aralashuvlari

INTRODUCTION

The respiratory system stands as the essential life system for humans because it executes gas exchange and controls acid-base balance and performs metabolic processes [1]. Nurses who work in different clinical environments need to learn about the respiratory tract's anatomical structures and its physiological functions because this knowledge forms the core of their patient treatment activities [2]. The human respiratory system contains two main parts which are the upper respiratory tract that includes the nasal cavity and pharynx and larynx and the lower respiratory tract that contains the trachea and bronchi and bronchioles and alveoli [3]. Modern nursing requirements mandate complete knowledge about the human respiratory system to enable nurses to identify disease progress and to carry out suitable medical procedures and to assess the outcomes of their treatments [4]. Respiratory diseases continue to rank among the top global health issues despite major improvements in respiratory treatment because the healthcare system requires expert nurses who deliver treatment based on proven medical practices [5].

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

METHODOLOGY AND LITERATURE REVIEW

This research used systematic literature review methodology to study peer-reviewed articles from worldwide medical and nursing research databases. The respiratory system according to established anatomical classifications divides into two parts which function through different physiological processes [1]. The conducting zone of the respiratory system starts at the nasal cavity and ends at the terminal bronchioles to perform its main job which involves air filtration and humidification and temperature control whereas the respiratory zone uses its respiratory bronchioles and alveolar sacs to perform actual gas exchange functions [3]. The research shows that respiratory function needs neural control systems to work together with respiratory muscles and pulmonary mechanics while breathing needs to match ventilation-perfusion for people to receive sufficient oxygen [2]. The research shows that the alveolar-capillary membrane which has a thickness of 0.5 micrometers allows oxygen and carbon dioxide to diffuse through the membrane according to concentration gradients [6]. Nursing literature emphasizes that comprehensive respiratory assessment includes evaluation of respiratory rate, rhythm, depth, breath sounds, oxygen saturation, and signs of respiratory distress, requiring systematic approach and clinical expertise [4]. Evidence-based nursing interventions for respiratory patients encompass airway clearance techniques, oxygen therapy administration, positioning strategies, breathing exercises, and patient education regarding disease management [7]. Studies confirm that nurses play crucial role in early detection of respiratory complications, implementation of preventive measures, and coordination of multidisciplinary care for patients with chronic respiratory conditions [5].

RESULTS AND DISCUSSION

Nurses improve their ability to assess patients and implement better treatments in respiratory care by combining their understanding of anatomy with their knowledge of human physiology. Nurses need to understand that the trachea splits at the carina into two main bronchi which includes a right bronchus that functions as a shorter and more vertical airway path. Nurses use their understanding of how lung compliance and airway resistance impact breathing work to determine which patients face respiratory failure risk and to provide them with proper medical care. The research shows that nurses who perform systematic assessments of patients through their anatomical landmarks which include tracheal position assessment and chest expansion measurement and lung field auscultation can better identify cases of pneumothorax and pleural effusion and consolidation at an early stage.

Research evidence supports that nursing interventions based on physiological principles, which include positioning patients with unilateral lung disease in lateral position with affected side up to optimize ventilation-perfusion matching, lead to significant improvements in oxygenation parameters [7]. The nursing strategies for airway management in patients with increased secretions depend on the understanding that the mucociliary clearance mechanism needs adequate hydration and humidification to function at its highest effectiveness [8]. Studies show that nurses who receive training in respiratory anatomy and physiology develop better clinical reasoning abilities for treating patients with acute respiratory distress syndrome, chronic obstructive pulmonary disease, and postoperative respiratory complications [9]. Nurses play an essential role in modern healthcare because they monitor respiratory patterns, detect abnormal breathing sounds such as wheezing and crackles and stridor, and link these symptoms to their corresponding pathophysiological conditions [10]. Evidence shows that nursing education programs which use anatomical models and physiological simulations and clinical case studies help students develop skills for respiratory assessment and intervention.

AMERICAN ACADEMIC PUBLISHER
INTERNATIONAL JOURNAL OF MEDICAL SCIENCES
ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

Contemporary nursing practice demonstrates that knowledge of respiratory mechanics, including the role of intercostal muscles, diaphragm, and accessory muscles during normal and labored breathing, directly influences nursing interventions during acute respiratory distress. Nurses who understand that diaphragmatic breathing utilizes the most efficient respiratory muscle can effectively teach patients breathing techniques that reduce energy expenditure and improve ventilation efficiency. Clinical observations reveal that patients with chronic obstructive pulmonary disease often develop barrel chest configuration due to air trapping and loss of lung elasticity, which nurses must recognize as compensatory mechanism requiring modified care approaches. Furthermore, understanding that normal respiratory rate varies with age, from approximately 30-60 breaths per minute in newborns to 12-20 breaths per minute in adults, enables nurses to establish appropriate baseline parameters and identify deviations requiring intervention. The anatomical knowledge that alveolar surface area spans approximately 70 square meters in healthy adults underscores the massive gas exchange capacity and helps nurses appreciate how even minor pathological changes can significantly impact respiratory function.

Advanced nursing assessment incorporates understanding of respiratory control mechanisms, recognizing that medullary respiratory centers respond to carbon dioxide levels while peripheral chemoreceptors monitor oxygen concentrations. This physiological knowledge enables nurses to interpret arterial blood gas results accurately and anticipate patient responses to oxygen therapy and ventilatory support. Clinical experience confirms that nurses proficient in respiratory anatomy can precisely describe adventitious breath sounds location using anatomical landmarks such as intercostal spaces, scapular lines, and sternal borders, facilitating accurate documentation and interprofessional communication. Recognition that lung apices extend above the clavicles and lung bases rest on the diaphragm at the level of the sixth rib anteriorly guides thorough auscultation technique encompassing all lung fields. Additionally, understanding that pleural space normally contains minimal fluid allowing smooth lung expansion helps nurses identify abnormal findings such as pleural friction rub indicating inflammation or increased dullness suggesting effusion. Practical application of anatomical and physiological principles in daily nursing practice transforms theoretical knowledge into tangible improvements in patient safety, comfort, and clinical outcomes across various healthcare settings.

CONCLUSION

Comprehensive understanding of respiratory tract anatomy and physiology forms the foundation for competent nursing practice in respiratory care. Integration of anatomical knowledge with physiological principles enables nurses to perform accurate assessments, recognize pathological changes early, and implement evidence-based interventions that improve patient outcomes. The complex structure of respiratory system, from conducting airways to gas exchange surfaces, requires nurses to possess detailed knowledge of normal anatomy to identify deviations indicating disease processes. Similarly, understanding physiological mechanisms such as ventilation-perfusion matching, gas diffusion, and respiratory control allows nurses to interpret clinical findings and adjust care accordingly. Contemporary nursing practice demands continuous professional development in respiratory care, emphasizing both theoretical knowledge and practical skills application in diverse clinical settings. Future nursing education should prioritize integration of anatomical, physiological, and clinical perspectives to prepare nurses for increasingly complex respiratory care challenges in modern healthcare environment.

AMERICAN ACADEMIC PUBLISHER

INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 6. No 01. January ,2026

REFERENCES

1. Tortora, G.J., Derrickson, B. (2017). Principles of Anatomy and Physiology. 15th Edition. Wiley Global Education, 854-892.
2. West, J.B. (2012). Respiratory Physiology: The Essentials. 9th Edition. Lippincott Williams & Wilkins, 1-198.
3. Netter, F.H. (2018). Atlas of Human Anatomy. 7th Edition. Elsevier, 194-234.
4. Berman, A., Snyder, S., Frandsen, G. (2016). Kozier and Erb's Fundamentals of Nursing: Concepts, Process, and Practice. 10th Edition. Pearson, 1271-1320.
5. Hinkle, J.L., Cheever, K.H. (2018). Brunner & Suddarth's Textbook of Medical-Surgical Nursing. 14th Edition. Lippincott Williams & Wilkins, 607-745.
6. Hall, J.E. (2016). Guyton and Hall Textbook of Medical Physiology. 13th Edition. Elsevier, 475-522.
7. Lewis, S.L., Dirksen, S.R., Heitkemper, M.M. (2017). Medical-Surgical Nursing: Assessment and Management of Clinical Problems. 10th Edition. Elsevier, 453-531.
8. Белевский А.С., Авдеев С.Н. (2019). Клиническая физиология дыхания. ГЭОТАР-Медиа, 112-145.
9. Potter, P.A., Perry, A.G., Stockert, P.A., Hall, A.M. (2017). Fundamentals of Nursing. 9th Edition. Elsevier, 867-921.
10. Смирнова Т.В., Иванова Н.А. (2020). Сестринский уход при заболеваниях дыхательной системы. Медицина, 78-134.