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The Role of Nurses in Interventional Pulmonology: Comprehensive Care Across Procedures - Reflections from a Nursing Fellowship Program in India

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Introduction

As a respiratory nurse working at the Bronchoscopy Unit in Kenya's National Referral Hospital (K.N.H) & having specialized training in Interventional Pulmonology at Yashoda Hospital, India, I have gained extensive experience in the diverse range of procedures that define this rapidly evolving subspecialty. My fellowship journey has provided unique insights into the critical role that nursing professionals play across the entire spectrum of interventional pulmonology procedures, from diagnostic bronchoscopy to complex therapeutic interventions.

Interventional Pulmonology has transformed respiratory medicine over the past two decades, encompassing minimally invasive procedures for both benign and malignant thoracic diseases. While these technological advances have revolutionized patient care, the success of these interventions depends heavily on specialized nursing expertise that spans multiple procedures, patient populations and care settings.

The nursing role in Interventional Pulmonology extends far beyond traditional medical-surgical nursing, requiring specialized knowledge in airway anatomy and management, advanced imaging techniques, sedation monitoring and complex therapeutic procedures. Through this comprehensive reflection on my fellowship experience, I aim to highlight the multifaceted contributions of respiratory nurses to the success of interventional pulmonology programs and advocate for greater recognition of nursing expertise in this specialized field.

Understanding Interventional Pulmonology

Interventional Pulmonology represents a subspecialty focused on minimally invasive diagnostic and therapeutic procedures for patients with thoracic diseases. This field encompasses a broad range of interventions including flexible and rigid bronchoscopy, Endobronchial Ultrasound (EBUS), Electromagnetic Navigation Bronchoscopy (ENB), medical thoracoscopy, bronchial thermoplasty, airway stenting, endobronchial valve placement and various pleural procedures.

The scope of interventional pulmonology continues to expand with technological innovations and evolving treatment paradigms. Modern procedures address conditions ranging from lung cancer staging and treatment to benign airway stenosis, pleural diseases and severe asthma management. Each procedure category presents unique challenges and requirements for specialized nursing care.

In the Indian healthcare context, interventional pulmonology serves as a crucial bridge between conservative medical management and surgical intervention. The subspecialty's emphasis on minimally invasive approaches aligns well with resource-conscious healthcare delivery while providing advanced treatment options for complex respiratory conditions prevalent in our diverse population.

The Multifaceted Role of Interventional Pulmonology Nurses

Comprehensive Patient Assessment and Care Coordination

The interventional pulmonology nurse's role begins with comprehensive patient assessment that extends beyond traditional nursing evaluations. This assessment encompasses respiratory function evaluation, comorbidity analysis, procedure-specific risk stratification and psychosocial assessment. Nurses must understand the unique requirements of each interventional procedure to provide appropriate pre-procedure preparation and patient education.

Care coordination represents a critical nursing function, particularly in complex cases requiring multiple procedures or interdisciplinary collaboration. Nurses serve as liaisons between various specialists, coordinate scheduling for sequential procedures and ensure seamless communication among healthcare team members. This coordination becomes particularly important in cases requiring multimodal therapy or when procedures are performed across different hospital departments.

Patient advocacy forms the cornerstone of nursing practice in interventional pulmonology. Nurses must balance patient autonomy with clinical necessity, ensuring that patients understand treatment options while respecting cultural and personal preferences. This advocacy role becomes particularly complex when dealing with terminal diagnoses or when patients face difficult treatment decisions.

Procedure-Specific Nursing Expertise

Bronchoscopic Procedures

Flexible and rigid bronchoscopy procedures require specialized nursing knowledge in airway management, sedation monitoring and complication recognition. Nurses must understand the different types of bronchoscopic interventions, from simple diagnostic procedures to complex therapeutic interventions such as tumor debulking, foreign body removal and airway stenting.

The nursing role includes equipment preparation and management, patient positioning, monitoring of vital signs and oxygen saturation and immediate post-procedure care. For therapeutic bronchoscopy procedures, nurses must be prepared to manage potential complications including bleeding, pneumothorax and respiratory distress while supporting the physician's interventional efforts.

Endobronchial Ultrasound (EBUS) Procedures

EBUS procedures demand specialized nursing skills in ultrasound technology understanding, lymph node sampling techniques and specimen handling protocols. Nurses must coordinate with pathology services to ensure proper specimen processing and maintain sterile technique during tissue sampling procedures.

The complexity of EBUS procedures requires nurses to understand mediastinal anatomy, recognize ultrasound findings and anticipate procedural requirements based on imaging results. This knowledge enables nurses to prepare appropriate equipment and provide seamless assistance during diagnostic sampling.

Pleural Procedures

Medical thoracoscopy and other pleural interventions require nursing expertise in chest tube management, pleural fluid analysis and post-procedure monitoring for complications such as pneumothorax or pleural bleeding. Nurses must understand pleural anatomy, recognize signs of tension pneumothorax and manage chest drainage systems effectively.

The nursing role in pleural procedures extends to patient positioning, sedation management and coordination with interventional radiology or surgery services when indicated. Post-procedure care includes monitoring for respiratory distress, managing pain and educating patients about activity restrictions and follow-up requirements.

Advanced Therapeutic & Diagnostic Procedures

Complex interventions in Interventional Pulmonology such as bronchial thermoplasty for severe asthma, endobronchial valve placement for emphysema and airway stenting for malignant obstruction require highly specialized nursing knowledge and preparation. These procedures often involve multiple sessions, extended monitoring periods and intricate post-procedure care protocols that demand critical nursing judgment.

Another valuable tool in both diagnostic and therapeutic domains is cryotherapy. Cryotherapy utilizes extreme cold to freeze and destroy abnormal tissue within the airways. From a diagnostic standpoint, it is often used for obtaining large, high-quality tissue biopsies, especially in cases where conventional forceps biopsies are insufficient such as with endobronchial tumors or suspected malignancies. On the therapeutic side, cryotherapy plays a role in debulking obstructive lesions, treating benign airway stenosis and controlling bleeding through cryo-coagulation.

For nurses involved in these procedures, a deep understanding of the indications, equipment preparation/setup, contraindications, procedural workflow and potential complications is essential. In cryotherapy, for instance, nurses must be alert to risks like airway bleeding or delayed sloughing of necrotic tissue. Proper airway suctioning, vigilant monitoring and readiness to assist in emergency situations are critical responsibilities.

Case Study & Personal Reflection

Case Study of an EBUS-Guided Mediastinal Lymph Node Cryo-Biopsy Procedure

During my fellowship, I assisted in a diagnostic Cryo biopsy procedure on a 57-year-old male patient; known Diabetic, Hypertensive and with history of old CVA. He had presented with fevers for the previous 10 days. CT scan imaging showed multiple mediastinal Lymph Nodes with the largest being left Lower Paratracheal lymph node. The patient was put under general anaesthesia with a supraglottic device acting as the conduit. A quick diagnostic bronchoscopy was done using a Fujifilm EB530T bronchoscope for the inspection of the airway. Then a Fujifilm EB530US EBUS bronchoscope was used to screen the present nodes. Station 4L was accurately identified and an electrocautery knife was used to create a tract into the lymph node with real time ultrasound guidance. Through the scope's working channel, a 1.1mm cryo probe was pushed into the lymph node still under ultrasound guidance and a sample collected after 3 seconds of freezing time. 4 Subsequent passes were made following the same technique. The tissue from the second sample collected, was rubbed onto a slide to make an imprint which was then processed for Rapid Onsite Cytology. Another tissue sample for culture was also collected since there was a differential diagnosis of Tuberculosis.

This case highlighted the advantages of using Cryotherapy in obtaining mediastinal lymph node biopsy which offered Excellent Tissue Quality thus suitable for histology or molecular profiling which is crucial in lung cancer staging. The No Needle approach also provided cost efficiency which was a financial relief to the patient. Generally, this technique also illustrated the safety procedural aspect by offering a minimally invasive approach since it combined real time ultrasound guidance.

My role in this case began from initial patient education and anxiety management through the help of my fellow nurses who translated English to Telugu which the patient & family understood. Since the patient had other comorbidities, an Informed consent was confirmed and a comprehensive check of the vital signs and baseline tests were also thoroughly checked to ascertain acceptable ranges before the procedure. All the equipment & items to be used were prepared ranging from the Bronchoscopes and their compatible processors, Suctioning unit & tubes, Cryo Machine & Probes, Electrosurgical unit & compatible knife, Sterile towels & gowns, gloves, syringes, lubricating gel, Assorted gauzes, specimen collecting containers with respective fluids either Normal saline or Formaline and also Rapid on Site items.

Intra procedurally, my main role as a specialized nurse was to assist the operator in order to ensure a smooth and safe procedure. This was through maintaining the bronchoscope's visibility by cleaning the camera tip, ensuring a smooth movement of the scope through the conduit by gel application and also collection of the tissue samples to the specified containers. Another critical role was operating the electrocautery knife & cryo probe which required timely coordination with the operator. With coordination of the anaesthesia team and the circulating room nurse we also monitored patient's vital signs throughout the procedure. The patient was then shifted to the recovery area where vital signs &

Post Operation complications monitoring continued including a post procedure Chest Xray done as per the department's policy. Through a well-coordinated team inclusive of fellows, nurses & anaesthesia personnel, all necessary documentation was complete and stored in patient's file. The patient together with the family were debriefed and patient was later transferred to the ward once fully awake and stable.

The successful management of this case, demonstrated the importance of specialized nursing knowledge in airway anatomy especially in identification of nodular stations, use of electrosurgical & Cryotherapy machines and their respective accessories. Ensuring a smooth & coordinated flow of the procedure while preparing for any probable complication the nurses contribute directly to a safe procedure outcome.

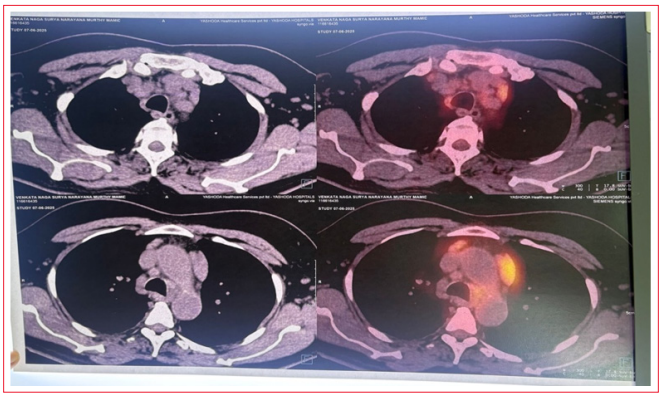

Figure 1

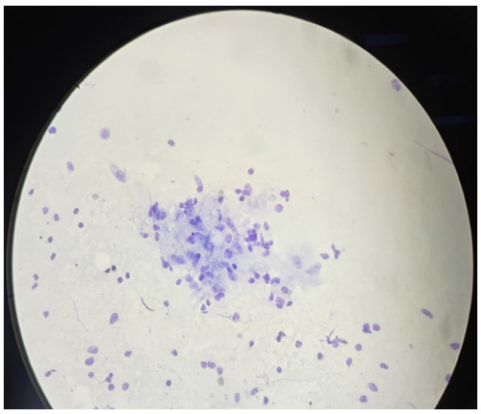

Figure 2

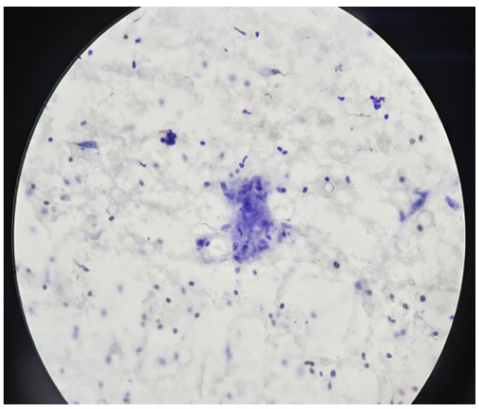

Figure 3

Figure 1: Shows a (CT-PET) FDG-Avid Mediastinal Lymphadenopathy: This is consistent with active metabolic activity, which could indicate:
o Malignancy (e.g., lymphoma or metastatic disease)
o Granulomatous disease (e.g., tuberculosis, sarcoidosis)
o Infectious or inflammatory causes (less common with this intensity)
Figure 2 & 3 Shows loosely formed granuloma highly favoring infectious processes than sarcoid granuloma.

(The above case was recorded live and featured in Pulmonology On Air China Launch Event on 13TH June, 2025 Video link → https://pulmonologyonair.com/video-library/pulmonology-on-air-china-launch-event-2025-part-4/ from Mins 2:17:05)

Collaboration with Multidisciplinary Teams
Interdisciplinary Coordination
Successful interventional pulmonology programs depend on effective collaboration between nurses, pulmonologists, anesthesiologists, radiologists, oncologists and surgical specialists. During my fellowship, I observed how nursing coordination facilitates seamless communication and efficient patient care across multiple specialties.

Pre-procedure team conferences allow nurses to contribute patient assessment findings, highlight specific care considerations and participate in treatment planning discussions. These collaborative approaches ensure that all team members understand patient-specific requirements and potential challenges before procedure initiation.

Educational Collaboration
Interventional pulmonology nurses serve as educators for patients, families and healthcare colleagues. This educational role includes formal patient education sessions, informal bedside teaching and participation in healthcare team education programs. The complexity of interventional procedures requires nurses to translate technical information into understandable terms while addressing patient and family concerns.

Peer education among nursing staff represents another critical function, particularly when new procedures or technologies are introduced. Experienced interventional pulmonology nurses must mentor colleagues and share expertise to maintain consistent quality standards across the nursing team in the department.

Quality Improvement Leadership
Nurses play essential roles in quality improvement initiatives within interventional pulmonology programs. Their direct patient care experience provides valuable insights into process improvement opportunities, patient satisfaction enhancement and complication prevention strategies.

Participating in multidisciplinary quality improvement committees allows nurses to advocate for patient-centered care improvements while contributing clinical expertise to program development and outcome measurement initiatives.

Cultural Considerations in Indian Healthcare
Family-Centered Care Integration
The Indian healthcare system's emphasis on family involvement requires interventional pulmonology nurses to skillfully navigate complex family dynamics while maintaining patient autonomy and confidentiality. This cultural consideration affects all aspects of nursing care, from consent processes to post-procedure education and discharge planning.

Successful integration of family-centered care requires understanding cultural hierarchies, communication patterns and decision-making processes within different cultural groups. Nurses must balance family involvement with professional responsibilities while ensuring that patient preferences remain central to care decisions.

Linguistic and Cultural Adaptation

India's linguistic diversity presents ongoing challenges for interventional pulmonology nursing practice. Effective communication requires either multilingual capabilities or skilled use of interpreter services to ensure patient understanding and safety throughout complex procedures.

Cultural adaptation of patient education materials and communication strategies represents an ongoing responsibility for interventional pulmonology nurses. This adaptation must consider religious beliefs, cultural practices and health literacy levels while maintaining scientific accuracy and clinical safety standards.

Economic Considerations

Resource limitations and economic constraints significantly impact interventional pulmonology nursing practice in Indian healthcare settings. Nurses must balance optimal patient care with cost considerations while advocating for essential resources and maintaining quality standards.

Creative resource utilization, efficient workflow development and cost-effective care coordination become essential nursing skills in resource-limited environments. These adaptations demonstrate nursing flexibility and innovation while maintaining patient care quality.

Technological Integration and Nursing Adaptation

Advanced Imaging Technologies

The integration of advanced imaging technologies such as EBUS, electromagnetic navigation and fluoroscopic guidance requires interventional pulmonology nurses to develop new technical competencies. Understanding these technologies enables nurses to provide appropriate patient preparation, equipment management and procedural assistance.

Continuous learning about emerging technologies represents an ongoing professional responsibility for interventional pulmonology nurses. This learning includes understanding equipment capabilities, safety requirements and patient care implications of new technological innovations.

Electronic Health Record Integration

Comprehensive documentation of complex interventional procedures requires sophisticated electronic health record skills and understanding of procedure-specific documentation requirements. Nurses must ensure accurate recording of procedural details, patient responses, and outcome measures while maintaining workflow efficiency.

Integration of electronic systems with procedural equipment and imaging technologies demands technical proficiency and adaptability as healthcare technology continues to evolve.

Professional Development and Education

Specialized Competency Development

The complexity of interventional pulmonology procedures demands continuous professional development and competency maintenance for nursing staff. This development includes technical skill acquisition, clinical knowledge updates and communication skill enhancement to meet the diverse needs of interventional pulmonology patients.

Formal competency assessment programs, continuing education requirements, workshops, seminars and mentorship opportunities contribute to maintaining high standards of nursing practice in specialized interventional procedures.

Research and Evidence-Based Practice

Interventional pulmonology nursing practice benefits significantly from research participation and evidence-based practice implementation. Nurses contribute valuable perspectives to clinical research while improving patient care through application of current evidence and best practices.

Developing research skills and critical appraisal capabilities enables interventional pulmonology nurses to contribute to the growing body of knowledge in this specialized field while advancing professional credibility and patient care outcomes.

Leadership Development

Advanced practice opportunities in interventional pulmonology require nursing leadership development and specialized clinical expertise. Leadership roles may include program coordination, quality improvement leadership and education program development within interventional pulmonology services.

Preparing nurses for leadership roles in interventional pulmonology contributes to program sustainability, quality improvement and professional advancement within the subspecialty.

Challenges and Solutions

Staffing and Workforce Development

Limited availability of specialized interventional pulmonology nurses represents a significant challenge for program development and service expansion. Addressing this challenge requires strategic workforce development, competitive compensation packages and professional growth opportunities.

Creating career pathways and advancement opportunities within interventional pulmonology nursing helps attract and retain qualified professionals while building program capacity for service expansion and quality improvement.

Resource Management

Balancing patient care quality with resource limitations requires creative problem-solving and efficient resource utilization strategies. Interventional pulmonology nurses must develop skills in cost-effective care delivery while maintaining safety and quality standards.

Advocating for essential resources, developing efficient workflows and participating in budget planning processes enable nurses to contribute to program sustainability while ensuring optimal patient care delivery.

Professional Recognition

Achieving appropriate recognition for specialized interventional pulmonology nursing expertise requires advocacy efforts, professional development and demonstration of nursing contributions to program success and patient outcomes.

Participating in professional organizations, publishing clinical experiences and presenting at conferences contribute to advancing recognition of interventional pulmonology nursing as a specialized practice area requiring advanced knowledge and skills.

Quality Improvement and Outcome Measurement

Patient Safety Initiatives

Interventional pulmonology nurses play crucial roles in patient safety initiatives, including complication prevention, error reduction and safety culture development. Their direct patient care experience provides valuable insights into safety improvement opportunities and risk mitigation strategies.

Participating in safety committees, incident analysis and improvement planning enables nurses to contribute expertise while enhancing overall program safety and quality performance.

Patient Satisfaction Enhancement

Understanding patient perspectives and experiences during interventional procedures enables nurses to identify satisfaction improvement opportunities and implement patient-centered care enhancements.

Regular patient feedback collection, satisfaction measurement and improvement initiative implementation demonstrate nursing commitment to patient-centered care and continuous quality improvement.

Outcome Measurement and Analysis

Interventional pulmonology nurses contribute to outcome measurement through data collection, analysis participation and improvement recommendation development. Their clinical expertise provides valuable context for interpreting outcome data and identifying improvement opportunities.

Developing skills in outcome measurement and quality improvement methodologies enables nurses to contribute meaningfully to program evaluation and enhancement efforts.

Future Directions and Recommendations

Educational Program Development

The growing complexity of interventional pulmonology procedures requires enhanced educational preparation for nursing professionals. Developing specialized certification programs, establishing competency standard, and creating structured training pathways would strengthen nursing practice in this field.

Collaboration with educational institutions, professional organizations and international partners could provide resources for curriculum development and educational program implementation.

Technology Integration Planning

Emerging technologies in interventional pulmonology, including artificial intelligence applications, robotic assistance and advanced imaging techniques, require proactive nursing education and integration planning.

Developing technology competency frameworks and ensuring adequate training resources will be essential for maintaining nursing expertise as procedural technologies continue to evolve.

Research and Scholarship Expansion

Encouraging interventional pulmonology nurses to participate in clinical research and scholarly activities would advance the profession while contributing to improved patient care standards and outcome measurement.

Creating research mentorship programs, providing time for scholarly pursuits and establishing funding opportunities could enhance nursing contributions to interventional pulmonology knowledge and practice advancement.

International Collaboration

Developing international partnerships and collaboration opportunities would provide access to best practices, educational resources and professional development opportunities for interventional pulmonology nurses.

Participating in international conferences, exchange programs and collaborative research initiatives could enhance nursing expertise while contributing to global advancement of interventional pulmonology nursing practice.

Conclusion

The role of nurses in interventional pulmonology encompasses a comprehensive range of responsibilities that are essential to successful program implementation and optimal patient outcomes. My fellowship experience has reinforced the critical importance of specialized nursing expertise across the full spectrum of interventional pulmonology procedures.

The complexity and diversity of interventional pulmonology procedures demand highly skilled nurses who can adapt to evolving technologies while maintaining the patient-centered approach that defines excellence in nursing care. As the field continues to expand, nurses must embrace opportunities for professional development, leadership roles and scholarly contributions to advance the subspecialty.

The unique characteristics of Indian healthcare, including cultural diversity, resource considerations and family-centered care approaches, require interventional pulmonology nurses to develop specialized competencies that extend beyond technical procedural knowledge. Addressing these requirements through targeted educational programs and professional development initiatives will be essential for advancing nursing practice in this specialized field.

Future success in interventional pulmonology will depend significantly on the availability of qualified nursing professionals who can provide expert care across diverse procedures and patient populations. Investing in nursing education, professional development and career advancement opportunities represents a crucial step toward meeting growing demand for specialized interventional pulmonology services.

The evidence demonstrates that specialized nursing care contributes directly to improved patient outcomes, enhanced satisfaction and program success in interventional pulmonology. Recognizing and supporting these nursing contributions through appropriate staffing, compensation, and professional development resources will be essential for sustainable program growth and quality improvement.

As interventional pulmonology continues to evolve, nurses must remain at the forefront of innovation, advocacy and quality improvement efforts. The comprehensive nature of nursing contributions to interventional pulmonology success provides a

strong foundation for continued professional growth and positive impact on patient care outcomes.

The future of interventional pulmonology depends on continued collaboration between nursing professionals and other healthcare disciplines in advancing patient care, improving outcomes and expanding access to specialized services. Through ongoing commitment to excellence, professional development and patient advocacy, interventional pulmonology nurses will continue to play essential roles in this dynamic and important subspecialty [1-16].

References

1. Gonuguntla HK, Shah M, Gupta N, Agrawal S, Poletti V, et al. (2021) Endobronchial ultrasound-guided transbronchial cryo-nodal biopsy: a novel approach for mediastinal lymph node sampling. Respirol Case Rep 9: e00808.
2. Ernst A, Feller-Kopman D, Becker HD, Mehta AC (2004). Central airway obstruction. American Journal of Respiratory and Critical Care Medicine 169: 1278-1297.
3. Vilmann P, Clementsen PF, Colella S, Siemsen M, De LeynP, et al. (2015) European Society of Gastrointestinal Endoscopy, Combined endobronchial and esophageal endosonography for the diagnosis and staging of lung cancer. European Respiratory Journal 46: 40-60.
4. Nursing and Midwifery Council of India (2021). Competency framework for specialized respiratory nursing practice. New Delhi: Government of India Press.
5. Herth FJ, Gompelmann D, Stanzel F, Bonnet R, Behr J, et al. (2016) STRIVE Study Group, Treatment of advanced emphysema with emphysematous lung sealant (AeriSeal®). Respiration 91: 411-418.
6. Castro M, Rubin AS, Laviolette M, Fiterman J, De Andrade Lima M, et al. (2010) AIR2 Trial Study Group, Effectiveness and safety of bronchial thermoplasty in the treatment of severe asthma. American Journal of Respiratory and Critical Care Medicine 181: 116-124.
7. Indian Association for the Study of Pain (2018) Guidelines for procedural sedation in interventional procedures. Mumbai: IASP Publications.
8. Wahidi MM, Herth F, Yasufuku K, Shepherd RW, Yarmus L, et al. (2016) AQuIRE Bronchoscopy Registry, Technical aspects of endobronchial ultrasound-guided transbronchial needle aspiration. Chest 149: 816-835.
9. Rivera MP, Mehta AC, Wahidi M M (2013) Establishing the diagnosis of lung cancer: Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest 143: e142S-e165S.
10. Sethi S, Nanda A, Chakraborty I, Kumar R (2017) Interventional pulmonology in India: Current status and future directions. Indian Journal of Chest Diseases and Allied Sciences 59: 201-208.
11. American Association for Respiratory Care (2019) AARC clinical practice guideline: Management of procedural sedation administered by respiratory therapists. Respiratory Care 64: 581-597.
12. World Health Organization (2019) Nursing workforce development strategies for specialized care delivery. Geneva: WHO Press.
13. European Respiratory Society (2018). ERS statement on interventional pulmonology nursing competencies. European Respiratory Journal 52: 1801820.
14. Bolliger CT, Sutedja TG, Strausz J, Freitag L (2006) Therapeutic bronchoscopy with immediate effect: Laser, electrocautery, argon plasma coagulation and stents. European Respiratory Journal 27: 1258-1271.
15. Indian Nursing Council (2020) Standards for specialized nursing practice in tertiary care settings. New Delhi: INC Publications.
16. Moorthy S, Mahadevan A, Narasimhan R (2019) Cultural competency in interventional procedures: An Indian perspective. Journal of Clinical and Diagnostic Research, 13: LC01-LC04.