49 Multidisciplinary Approach to Noninvasive Ventilation (NIV) in Critical Care

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Contents

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Abbreviations

APACHE	Acute Physiology and Chronic Health Evaluation
BiPAP	Bilevel positive airway pressure support
CI	Confidence interval
COPD	Chronic obstructive pulmonary disease
CPE	Cardiogenic pulmonary edema
ED	Emergency Department
HDU	High Dependency Unit
ICDSC	Intensive Care Delirium Screening Checklist
ICU	Intensive Care Unit
M–F	Monday–Friday
NCEPOD	National Confidential Enquiry into Patient Outcomes and Death
NEWS	National Early Warning Score
NIV	Noninvasive ventilation
OR	Odds ratio
UK	United Kingdom

49.1 Introduction

It has been over three decades since noninvasive positive pressure ventilation (NIV) delivered through a mask interface was introduced as an alternative mode of ventilatory support for those with acute respiratory distress and failure [1–3]. Since its entry into medical care, NIV has become the treatment of choice for a host of respiratory conditions, specifically acute exacerbations of chronic obstructive pulmonary disease (COPD) and cardiogenic pulmonary edema [4]. The list of conditions that can be successfully treated with NIV increases annually with increasing provider expertise and experience.

Patients were initially treated in closely monitored settings and initial experience was tempered by difficult application of therapy which often led to treatment failures. This limited its implementation in several locales, sometimes for years as healthcare providers sought to overcome the learning curve that accompanied NIV. This early difficulty also underscored the importance of a multidisciplinary approach to the application of NIV which differs from invasive mechanical ventilation. The providers involved with NIV are nursing, respiratory therapy, and physician staff and their roles are a little different when compared to patients treated with invasive ventilation. In the latter situation, the provider roles are well defined and usually do not overlap. With NIV, there is a need for more active multidisciplinary involvement by all parties to ensure the successful application of NIV. The primary focus of this review is the multidisciplinary aspects of care required for the successful application of NIV.

49.2 Methods

This review focuses on publications with publication dates between 2017 and 2019. A PUBMED search was conducted starting with the key words "multidisciplinary" and "noninvasive ventilation", and additional searches completed by adding the terms "nursing", "respiratory therapy", "healthcare providers", and "respiratory therapy providers". The search returned 1316 citations, but several citations were repeated with these multiple search strategies, and 907 more accurately reflects the number of citations with this search. Many of the citations dealt with invasive as opposed the noninvasive ventilation, as several were also consensus or guideline statements. The search did not identify any randomized trials or other interventional clinical trials on this subject. However, observational or retrospective studies were identified along with a few qualitative studies which addressed multidisciplinary aspects of care and comprise the bulk of this review. The review focused on the management of adult patients and reports in English. NIV use in neonatal patients and children were not included for review.

49.3 Multidisciplinary Elements of Care and Time Requirements

The successful application of NIV hinges on a comprehensive, multidisciplinary approach to therapy. It is instructive to review some of the early reports on NIV application to better appreciate the perspectives of each of the healthcare disciplines involved in management. The sentinel report about difficulty in patient management was from Chevrolet and colleagues published in 1991 [5]. Their primarily message involved the difficult and time-consuming nature of NIV and supported their experience with six prospectively evaluated patients. Several other issues may have clouded their experience. All of their patients had hypercapnic respiratory acidosis and were on the brink of respiratory failure and intubation. NIV was delivered via a nasal mask with volume cycled ventilators. Three had underlying restrictive physiology, one with neuromuscular weakness, one with severe pulmonary hypertension and fluid overload, and one with morbid obesity and obesity hypoventilation. Three had obstructive physiology, one with cystic fibrosis and the other two with advanced obstructive lung disease. Those with restrictive physiology were successfully treated, but those with obstructive physiology all failed and eventually required endotracheal intubation. The authors charted the time required at bedside and it averaged over 90% of their time for the failed patients compared to 40% for those successfully treated. High peak airway pressures (>30 cm H_2O) were noted for each patient who failed. Mouth leaks, patient ventilator discoordination, and pressure alarms were the main reasons required for the constant bedside presence by nursing. While this experience was attributed to the mode of ventilatory support (NIV), subsequent experience suggests some areas of application that could have been optimized, including the patient-mask interface (orofacial), type of ventilator (pressure cycled vs. volume), and the presence of respiratory therapy (not reported). Only one nurse was familiar with NIV prior to this reported trial and with training provided to other staff as they cared for the patient. In addition, patient selection may have also doomed therapy as those with obstructive physiology were also febrile and with significant secretions. In other words, the time-consuming aspect may not have been the ventilatory modality (NIV), but issues related to patient selection and methods of NIV application which have since improved.

In a prospective, randomized trial by Kramer and colleagues of 31 patients, the workload and perception of nurses and respiratory therapists were directly assessed during the trial [6]. NIV was delivered through a nasal mask with a relatively new ventilatory support device (bilevel positive airway pressure or BiPAP®, Respironics Inc.; Murrysville, PA) with average pressures after a day of use at 11.3 ± 0.9 cm H_2O. Both nursing and respiratory therapy spent around 100 min for the initial 8 h of treatment (~21%) and much less in the second 8 h, with respiratory therapy averaging 34 min (7%) and nursing 82 min (17%) of their time at the patient's bedside. The more important finding was that both respiratory and nursing spent comparable amounts of time with those who were invasively ventilated with similar levels of difficulty rating for both provider classes. Difficulty ratings were actually lower for those treated with NIV than invasive ventilation for both groups. These results can be attributed to several differences, starting with a different ventilatory support system, with lowered delivered peak airway pressures and technology, improved patient comfort, and acceptance of ventilatory support. In addition, there also seemed to be more training and greater familiarity with NIV by the front line healthcare providers.

A prospective observational trial by Nava and colleagues was undertaken to specifically address the actual workload and costs associated with NIV during the treatment of acute exacerbation of COPD [7]. Ten patients were treated with face mask NIV and pressure support ventilation and

were compared to six who require intubation and mechanical ventilation. The latter group was also paralyzed and sedated, and a stopwatch was used to record the actual time spent at the bedside by healthcare providers. This study included physicians, as well as nurses and respiratory therapists. They recorded workload for the first 48 h of ventilatory support. No differences were noted between NIV and intubated patient for either nursing or physicians, both groups spending about 14–18% of their time at the bedside. Respiratory therapists did spend more time in the first 6 h with NIV patients (~30%) compared to <10% with intubated patients, but over the course of treatment, workload decreased to be comparable to the intubated patients, comprising about 10% of their total time. The composite workload of all three groups was similar between NIV and intubated patients and the costs of treatment were also similar. After the initial 48 h, the investigators noted a further reduction in time at the bedside by both physicians and nurses with NIV patients, approaching 1 h/day, whereby physician and nursing time was stable for intubated patients at 2–4 h/day.

In a more recent study by Simonelli and colleagues, a physiotherapist (or respiratory therapist) focused cardiopulmonary rehabilitation unit in Italy reported their experience in 201 patients with chronic respiratory failure [8]. The physiotherapists spend an average of 17.2 ± 15.4 min on each session with each subject with more time spent for those with neuromuscular disease. They were able to achieve adequate training with an average of 8.2 ± 3.2 sessions (range 2–16), further supporting efficacy and minimal time requirements once staff involved with NIV are trained and comfortable with its application.

49.4 NIV Consensus Recommendations

Since these reports, issues involving excessive time or workload with NIV have faded but remain an important aspect of management. Consensus guidelines have continued to emphasize the importance of attention to technical issues [9]. The most frequent reasons for NIV failure remain excess mask leak, insufficient ventilatory support, and patient ventilator asynchrony, issues that were identified as causes of NIV failures since its initial application. These reflect issues that are best identified and managed at the bedside and require close attention by front line providers, specifically nursing and respiratory therapy staff. This further reinforces the need for close monitoring and a multidisciplinary approach to management.

In their guidelines on the ventilatory management of acute hypercapnic respiratory failure in adults, the British Thoracic Society/Intensive Care Society provides a framework for patient management to include immediate clinical assessment, an assisted ventilation plan, and recovery and discharge plans [9]. Included in their recommendations were identification of a specifically identified NIV treatment area, staffing levels with nursing assignments of one nurse for every two NIV patients, NIV protocols, designated lead of a core NIV multidisciplinary group, access to NIV technical support, audit mechanisms and regular staff education as well as training modules. The construct of the multidisciplinary team included physicians, nursing, and physiotherapists. It should be noted that in Europe, the physiotherapist provides the same role and function as the respiratory therapist in North America. For all intents and purposes, the position should be considered the same, despite some differences in the scope of practice.

49.5 NIV-Focused Care Audit

To further examine the status of NIV delivery, the British Thoracic Society proposed an audit of the status of NIV in the United Kingdom (UK), which was conducted by the Clinical Outcome Review Program and published by the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) in 2017 [10]. Through a combination of questionnaires and case reviews, the group analyzed 353 patients and 165 hospitals

who were treated with NIV. It is worthwhile to review their findings with respect to the multidisciplinary focus of this review and the findings fall into the following broad categories.

49.5.1 Staffing

A lead physician or "designated expert" in NIV available 24/7 is one of their guideline recommendations, but in over half (55%), this coverage was provided by the general medical staff. Only 23% had recommended coverage by a subspecialty respiratory consultant (pulmonary physician). In 75% of the hospitals, a respiratory consultant was available less than half of the time. With respect to nursing, less than half (49%) of the hospitals had recommended nursing ratios (1:2 NIV patients). Changes to ventilator settings were most commonly performed by the respiratory consultant, but in 20%, changes were made by medical trainees (resident physicians), more than half by nurses and in more than a third by the physiotherapist. Most hospitals (89%) did report annual training programs in NIV. A competency assessment for NIV was present in 82% of hospitals, but 38% permitted staff without NIV competency to supervise the care of NIV patients. In hospitals without a medical lead for NIV, nursing represented that lead in 44% and physiotherapy in 15%.

49.5.2 Protocol

With respect to local guidelines or protocol on the management of NIV patients, most facilities had guidelines with >90% having materials listing indications, contraindications, and escalation. Protocol or guidelines for weaning were present in 73%. A prescription form for the management of NIV patients was found in 69% and a specific observation chart in 83%. In addition to a protocol for treatment, a National Early Warning Score (NEWS) was also recommended to track patients which in turn would trigger alerts for deteriorating patients who may warrant escalation of care. They found that NEWS were not consistently documented in 47% of cases. In addition, an initial respiratory consultant was only called in 24% of their cases and 14% had no defined initial management plan on inappropriate plan. Eventually, 75% of patients had respiratory consultant review.

49.5.3 Outcomes

The overall success rate of NIV was 64%, with only 5% proceeding to intubation and mechanical ventilation, and 25% had treatment withdrawn. They reported mortality of 35%, with a mortality rate of 25% in those with COPD. Their reviewers cited the quality of NIV care as good in 27.5%, acceptable in 48.5%, but poor or unacceptable in 24%. There were opportunities for improvement in management noted in 60% of their cases.

49.5.4 Recommendations

The panel identified 21 recommendations, but the most important related to this review involve governance, treatment, and review of NIV care. First and foremost, there should be a clinical lead for NIV encompassing medical and nursing leadership. A minimal staffing ratio of one nurse to two NIV patients is recommended. Operational policies must be in place that address clinical areas of application, staff, escalation of treatment, documentation, and frequency of patient review. Staff must have minimal competency in NIV management and NIV management and care must be discussed daily with those with NIV expertise. Governance policies should include all sites of NIV application and all disciplines, specifically medical, nursing, and physiotherapy personnel. And lastly, NIV management to include mortality and quality of care should be audited and reviewed at least annually.

These recommendations were made to address issues identified in the British healthcare system, but these general principles are applicable to all healthcare systems and all areas where NIV is administered. These issues have been previously

noted to contribute to worsening outcomes in association with training, experience, and staffing [11–15], but this association, while intuitive can be difficult to demonstrate short of a focused audit as outlined in the NCEPOD report.

49.6 Multidisciplinary Issues

49.6.1 Location of Care

These and other issues have been the focus of recent observational or retrospective studies which form the remainder of this review. An analysis of ten Spanish units involved 387 patients with mixed results, but clearly success rates for NIV were lower (58% vs. 66%) when patients were treated in a ward setting where nursing and staffing ratios are lower than an intensive care unit (ICU), and issues with inadequate training were identified [16]. The emergency department (ED) had the greatest success (83%) despite a lower nursing ratio of 1:8–12, possibly related to closer overall monitoring in an ED setting.

Another observational study compared three models of care in Australian NIV patients (ward, specialized high dependency unit (HDU) and ICU) during 91 episodes of respiratory failure requiring NIV in three hospitals with established NIV experience [17]. It is noteworthy that all sites had a respiratory specialist whether nursing or physician background. No significant difference was noted in the groups with respect to demographics and severity of the respiratory illness. Nursing ratios were 1:4 and 1:8 for the ward, 1:2 for the HDU, and 1:1 for the ICU. Respiratory consultants were available for HDU and ICU patients on a daily basis, but thrice weekly for the ward patients. Correction of respiratory acidosis and overall outcomes were no different between any of the three units. However, the intubation rate was higher in the ICU patients (20%) vs. 0–2% for the other sites. This experience demonstrates that the location of NIV application may not matter in terms of outcomes, provided there are staff well trained in NIV patient management. Costs associated with ward care were less, but other issues with respect to severity of illness, patient preferences, and direction of care were not assessed as these may explain the differences in intubation rate.

49.7 Key Elements of NIV Administration

Operator-dependent factors, defined as inappropriate indications for NIV application, inadequate ventilator settings, inadequate patient reassessment, and titration of ventilatory support have been identified as a cause of NIV failure, in a retrospective review of 1095 patients treated in a Florida hospital [18]. The authors were unable to identify specific responsibility for these aspects of care, but these categories clearly implicate all those involved, including physicians, nursing, and respiratory therapy. The authors did not report a statistical analysis, but these categories which comprised 13–33% of the reasons for failure and failure of NIV was associated with a 22% mortality.

49.7.1 Protocols

Some of these identified deficiencies may be addressed with specific treatment protocols or dedicated treatment teams. Protocol management is not a new concept and was an integral part of patient management introduced in a prospective, randomized description of ward-based NIV care [19]. This was a crucial aspect of successful patient outcomes as the staffing ratio was as low as 1:13 and training was modest comprising of an initial 8 h and then monthly refresher sessions. There was standardized treatment, regular arterial blood gas determinations, and pre-established criteria for deterioration and intubation. They demonstrated a reduction in the number of patients meeting criteria for intubation with NIV (15% vs. 27%, $p < 0.02$) and hospital mortality (10% vs. 20%, $p = 0.05$), with the actual intubation rates lower (6% vs. 10%) and an extra 26 min of nursing time required during the first 8 h of care.

Protocols are an important aspect of management as they provide guidance during periods of deterioration where other members of the multidis-

ciplinary team may not be immediately available. The existence of protocols and training was one of the key issues identified as crucial for the success of NIV. As an extension of protocol management, a dedicated treatment team that is not restricted by the physical limitations of location is another model of multidisciplinary care that has been demonstrated to be effective at providing NIV.

49.8 NIV-Focused Treatment Teams

In a retrospective before and after review, a dedicated respiratory therapy team in a Swiss hospital managed a total of 126 ICU patients with COPD exacerbations [20]. Prior to the respiratory team, physicians and ICU nurses managed the patient, but this was left to trained respiratory therapists as the intervention under review. This relieved nursing staff of the NIV care of these patients. The dedicated NIV treatment team significantly increased NIV utilization (64–92%, $p < 0.01$). There was no difference in the severity of illness between the cohorts, but those treated with the dedicated NIV team had a decreased odds ratio for death or intubation (OR = 0.20; 95% CI 0.06–0.70) representing a 14.6% reduction in the absolute risk of death or intubation in those managed by the dedicated treatment team. This is a unique approach and addresses some of the nursing time commitment issues that may have limited NIV application.

In another cohort study from Switzerland, a multidisciplinary respiratory care team comprised of a pulmonologist and respiratory therapist focused on patients presenting with respiratory failure to the Emergency Department (ED) with a goal of "instantaneous" NIV support [21]. The team was operational only during typical administrative hours (M–F; 0800–1800) and in their cohort of 63 patients, the door to NIV time averaged 56 min (range 32–97 min). This experience was substantially shorter than NIV initiated outside their window which averaged 84 min (range 57–166 min). Their cohort had uniform improvement in cardiopulmonary parameters with NIV treatment. They reported an immediate failure rate of 2%, but over the hospitalization, mortality was 19%. While they were not able to correlate outcomes with the presence of a dedicated team, they provided a proof of concept of rapid initiation of NIV with a dedicated, trained NIV team. A summary of these treatment models is outlined in Table 49.1.

Table 49.1 Summary of multidisciplinary models of care

Reference	Location	Staff	Additional training	Guidelines	Impact
Plant et al. [19]	Ward	Nursing 1:13	8 h Monthly	Arterial blood gas Standard orders Criteria for escalation	Decreased intubation Decreased mortality
Parker et al. [17]	ICU	Nursing 1:1 Physician	None stated	Local	No differences
	HDU	Nursing 1:2 Respiratory nurse	None stated	Local	No differences
	Ward	Nursing Day: 1:4 Night: 1:8 Respiratory nurse	None stated	Local	No differences
Simonelli et al. [8]	Rehab ward	Physician Physiotherapist Nursing	2 h 15 days apprenticeship	Local	Increased efficiency
Horvath et al. [21]	ED	Physician Respiratory therapist	Local training	Local	More rapid NIV
Vaudan et al. [20]	ICU	Physician/nursing vs. Respiratory therapist	Local training	Local	Decreased intubation Decreased mortality Shorter length of stay

49.9 Nursing Care Issues

Most of the focus has been on respiratory therapy, with a relative paucity of investigations related to nursing issues. This has been outlined in a recent review and issues identified reinforce those previously highlighted [22]. These include the experience and skill of those administering NIV, mask leaks, patient-ventilator synchrony, and interface issues. Some areas not previously highlighted include patient discomfort, gastric distension, and local pressure ulcers associated with the mask and enteral feedings. They did allude to nursing requirements for a minority of patients, citing a nursing activity score that indicated about one-fourth of NIV patients would require a nursing ratio of 1:1. No clinical trials have addressed these issues and these represent opportunities for more nursing research.

49.10 Patient Care Perspectives

The other aspect of NIV that has long been neglected has been the perspective of the patient undergoing noninvasive ventilatory support. This is important given increasing focus on patient-centered care. The majority of the work in this area has been qualitative, involving structured interviews or questionnaires and mostly led by nursing. The investigations have focused on patient perspectives, and reasons behind acceptance and discontinuation of NIV. Jerpseth and colleagues focused on the experience of the patient with advanced COPD in Norway [23]. Part of the focus of these 12 interviews involved perception of their disease as well as experience after an illness that required NIV support. Feelings of isolation, dyspnea, and fragility were common themes. Patients viewed the mask NIV as both a savior and a burden, referring to the latter as a "life buoy". In addition to pain and claustrophobia, there were also expressions of hopelessness and loss of control. More importantly, subject often felt that they had been excluded from decision making and were left out of discussions of prognosis, death, and dying.

In another study of 12 patients from Japan, a mixed-methods approach was used to assess patient experience on NIV [24]. They first conducted semi-structured interviews and then used information identified from those interviews to assess the experience of 126 patients who were treated with NIV. They identified eight primary issues associated with NIV. Technical issues involved discomfort with the mask and air pressure and flow. From a subjective standpoint, subjects expressed relief of dyspnea with NIV, but also noted sleep deprivation as a prominent issue. They were often unable to visualize the need for NIV, but gradually came to acknowledge their need for NIV, relief of anxiety, and discomfort associated with nursing involvement as well as increased acceptance of NIV with self-directed measures.

In their analysis of 126 patients treated with NIV, they were able to separate their analysis between those successfully treated with NIV and those who either discontinued NIV or required intubation with NIV. One of their measures included a delirium score, the Intensive Care Delirium Screening Checklist (ICDSC) where a score of 3–5 is considered delirious. It is noteworthy those who stopped or "abandoned" NIV all had high scores ≥5. Those with lower scores and sleep deprivation were also more likely to stop NIV. Sleep deprivation was an especially important factor with an odds ratio (OR) of 72.36 (95% CI 9.07–577.16; $p < 0.001$) for abandonment of NIV. Mask discomfort generated an OR of 4.38 (95% CI 1.07–17.96; $p = 0.04$). The ICDSC score after 12 h of NIV had an OR of 1.62 (95% CI 1.11–2.37; $p = 0.013$). High oxygenation ratios ($PaO_2/FIO_2 > 192$) after 3 h of NIV were also associated with cessation of NIV (OR 1.01; 95% CI: 1.001–1.018; $p = 0.025$). When examining their NIV patients who were intubated, parameters that identified those converted from NIV to invasive ventilation were APACHE II scores (OR 1.10; 95% CI 1.005–1.227; $p = 0.040$), improved in dyspnea after 6 h (OR 0.272; 95%

CI: 0.076–0.976; $p = 0.046$); and a $PaO_2/FIO_2 < 120$ after 3 h of NIV (OR 0.987;95% CI 0.978–0.995; $p = 0.002$). In summary, increased severity of illness, ongoing dyspnea, suboptimal oxygenation, and mask discomfort are well recognized factors that contribute to the failure of NIV. In addition, sleep deprivation and delirium are also risk factors that predict patient cessation of NIV. These latter two elements have not been well recognized and are important clinical features that may often be first noted by nurses and other bedside healthcare providers. These certainly represent opportunities to improve and optimize NIV delivery.

49.11 NIV Providers and Patient Perceptions

In a further analysis of multidisciplinary aspects of NIV, a questionnaire survey of 32 French and Belgian ICUs of a total of 311 ICU physicians, 752 nurses, 396 patients, and 145 relatives revealed marked differences in perceptions of NIV among both healthcare providers, patients and their families [25]. Of note, less than half (45%) reported written guidelines on NIV use. There was discordance in willingness to administer NIV between physicians (64%) and nurses (32%), with those with a higher case volume, more willing to administer NIV. Individual perception of NIV competency was identified as independent factors for NIV use among both physicians and nurse. However, negative perceptions still exist with notations of "care for a NIV patient is excessively time-consuming", "it is an aggressive device", "it makes patients suffer", and "feeling of regret in relation to NIV". Among patients and relatives, anxiety (37% and 45% respectively) were the most common responses. Dyspnea, long duration of NIV, and need to have someone bedside were independent risk factors for anxiety. In summary, the most noteworthy findings of this questionnaire are the discrepant perceptions of efficacy between physicians and nurses, patients and their relatives. A great portion of nursing staff felt NIV was traumatic and stressful to patients. Others have noted differences in expectations between physicians and other healthcare providers, specifically respiratory therapists in NIV efficacy and outcomes, and therefore this discordance between physicians and nurses, patients and their relatives has been previously noted and is not totally unexpected [26]. However, this is especially noteworthy given this study is from a region where there is a relatively high use of NIV, especially when compared to the United States. This report also suggests that there may be a less than optimal multidisciplinary approach to the care of these patients and identifies an opportunity for improvement with additional NIV training and education.

Another questionnaire survey of 407 Spanish nurses and physicians highlighted gaps in knowledge and management issues with respect to noninvasive ventilation [27]. It is noteworthy that the overall percentage of correct responses was only 50%. The authors demonstrated nurses had less knowledge than physicians about NIV with average scores of 3.27 ± 0.5 vs. 2.62 ± 0.5, difference 0.65; 95% CI: 0.48–0.82, $p < 0.01$ (lower scores with greater knowledge). Mask and patient-ventilator synchronization were the most commonly cited issues, with no differences noted between nurses or physicians. The results also highlight the need for more education and training.

49.12 Conclusions

It has been well recognized that NIV has required a multidisciplinary effort to achieve optimal outcomes. This primarily involves three groups of healthcare providers, physicians, nurses, and respiratory therapists (physiotherapists in some countries). What was once very laborious and time-consuming has turned into a first-line intervention for most patients with acute exacerbations of COPD and cardiogenic pulmonary edema. But the success of NIV still depends on the multidisciplinary cooperation between all three disciplines.

Table 49.2 Multidisciplinary recommendations for NIV infrastructure and patient management (adapted from NCEPOD report [10])

Clinical lead
Physician
Nursing
NIV training/expertise
Operational policy
Identify appropriate clinical area
Minimal staff competency and training
Specialty training/expertise in NIV
Staffing ratios (recommended nurse: NIV patient 1:2)
Escalation procedures
Escalation of care (ICU)
Appropriateness of invasive ventilation
Limits of treatment
Step down procedures
Standard documentation
Vital signs (hourly until stable) and charting
Ventilator support and settings: standardized protocol adjustments
Frequency of review
Review of care with specialty consultant within 14 h and daily
Transition of care
Post-hospitalization
Home NIV
Governance of NIV unit
Multidisciplinary (medical, nursing, respiratory therapy)
Locations (Emergency Department, Ward, Step down, and ICU level)
Records
Database of NIV-treated patients
Annual audits of care
Morbidity and mortality review
Quality improvement

NIV training and education, explicit guidelines on patient management, including guidelines for escalation and termination of support are important aspects of care. Dedicated staff with specific expertise in NIV are important and in addition to clinical leads, a focused team of specialized healthcare providers may also translate into clinical benefit. Attention to detail is another important factor in NIV and refers to close bedside care and management, especially with respect to problems associated with the mask, ventilator, and patient-ventilator coordination. These issues have been previously cited as part of the essential components for an optimal NIV and are further summarized in Table 49.2. Less recognized features that impact NIV include patient identified issues of sleep deprivation, delirium, hopelessness, anxiety, and depression. Figure 49.1 provides a framework for the understanding of these multidisciplinary relationships and the central relationship to the patient. In addition to close working relationships, training and education are also essential components. These all represent areas that are amenable to a multidisciplinary approach to improve quality of care, which would translate into improved patient care and outcomes.

49.12.1 Learning Points

1. Multidisciplinary care is crucial for optimal delivery of NIV.
2. Training, education, protocols, and guidelines are important parts of multidisciplinary care.
3. Dedicated NIV treatment teams may be a treatment model.
4. Patient perspectives on NIV have not previously been well appreciated.

49.12.2 Critical Points

1. Multidisciplinary care remains suboptimal in many areas.
2. If providers are adequately trained, patient outcomes may not differ with location of care.
3. Discordance between perceptions and expectations of NIV exist.
4. Sleep deprivation and delirium are common and may be unrecognized in NIV patients.

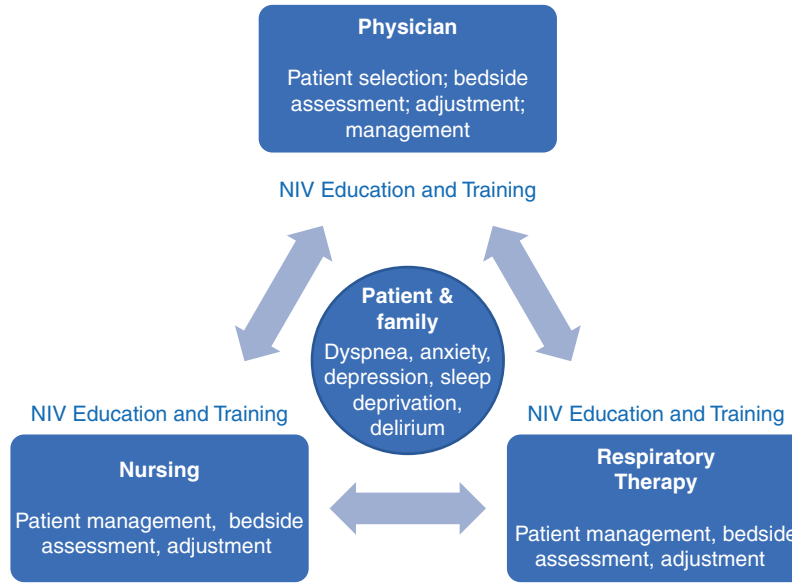

Fig. 49.1 Multidisciplinary relationship and roles of healthcare providers centered around patient-focused issues. The figure highlights the continuous interaction and interdependence of each discipline with each other and the domains of their focus. The patient is central to management and key patient issues are listed

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