Perspective

The Spanish society of pulmonology and thoracic surgery on the use of telemedicine in mechanical ventilation and sleep-disordered breathing

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ABSTRACT

The Spanish Society of Pulmonology and Thoracic Surgery published a position paper on sleep disordered breathing, notably in relation to positive pressure treatment, as a result of the rapid adoption of new information and communication technologies in medical practise. It should be noted that the lack of sizable, randomised, multicenter studies with extensive follow-up has resulted in some controversy in the scholarly literature. Additionally, there are a large range of telemetry tools and systems available. The recommendations are therefore mostly based on the agreement of knowledgeable professionals. The clear lack of rules on telemedicine and the activities of commercial organisations is another crucial issue that is covered in great detail in this article. Patient individualization is the y-element

Key Words: *CPAP; Mechanical ventilation; Sleep apnea.*

INTRODUCTION

The delivery of healthcare services by all healthcare professionals using information and communication technologies for the exchange of reliable information for the diagnosis, treatment, and prevention of disease and injuries is what the World Health Organization defines as TM. Distance is a crucial factor in this definition. The use of TM can significantly improve the welfare of people and communities, as well as generate effective and affordable care networks, research and evaluation projects, and continuing professional development. This position paper will discuss SDB and its position within various care circuits, as well as the necessary components and various actors involved in the usage of the TM. The authors of this position paper think it will be easier for SEPAR to communicate and disseminate its TM guidelines in SDB if it adopts the structure of the American Academy of Sleep Medicine (AASM) and American Thoracic Society statements. As a result, after the initial suggestions, the manuscript is broken up into many sections that will cover theoretical issues, the perspective of suppliers—a novel component of our paper—, practical and technological issues, and the current legal and data protection considerations (which we also consider to be a crucial issue). Last but not least, a general framework will be put out that we think will help comprehend TM in the context of clinical care, particularly from the perspective of various levels of care networks Continuous positive airway pressure, information and communication technology, TM (telemedicine), sleep-disordered breathing (SDB), and the material provided by each author individually have all been used as the foundation for the creation of each chapter. Asynchronous TM, which involves deferred contact, and synchronous TM, which involves a real-time connection (such as video conferencing or telephone coaching), are two different types of TM (automatic electronic messaging, and remote monitoring platforms). A list of studies organized by the kind of TM employed can be found in the appendix. Synchronous TM refers to methods for delivering healthcare in real-time, including video visits or video consultations. The meeting in this mode is meant to serve as a face-to-face encounter. Patients benefit from video and phone calls because

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they can avoid the time and money spent coming to the hospital or missing work hours. It might frequently be used to check compliance, do routine chronic follow-ups on patients using CPAP or NIV, and monitor the corresponding disease.

This strategy will be constrained if a physical examination of any type is required; however, in sleep medicine, many stable patients can be adequately examined without one. In many instances, the issue might be resolved with sufficient coordination with primary care (through care networks), or sometimes a straightforward face-to-face contact would be sufficient. It is obvious that to conduct visits, assessments, and therapeutic management effectively, both professionals and patients need to be trained. The following are the most crucial of the particular considerations for this modality that the AASM has highlighted: the technological abilities required to implement this kind of TM on an online platform with sufficient bandwidth and support infrastructure; patient documentation, including recommendations for tests, treatments, and prescriptions, all administered to the same standards as in-person consultations. The contact between patients and the healthcare provider does not take place in real-time in asynchronous TM, also known as the store and forward method. When a diagnosis or consultation of the supplied information is not urgent and can wait, the asynchronous mode is used. The majority of current activity is concentrated in this modality. Storage of medical test data for later analysis; access to therapeutic information stored in databases (Philips Encore Anywhere or Resumed Air view platforms); electronic messages from the provider to the patient (email, text, and WhatsApp messages) to communicate appointments or decisions; remote monitoring with delayed data receipt (equipment transmitting signals); storage of medical test data for later analysis; and finally automated care and self-management systems, such as platforms with patient feedback systems. Applications that are linked to other medical equipment or related to prescribe therapies may be available on personal mobile devices (smartphones or tablets). Data can be evaluated using a variety of predefined filters (compliance thresholds, rate of residual respiratory events, mask leaks), as well as clinical interventions that can be immediately downloaded and pre-programmed. In this context, it's important to keep the following in mind: Understanding sleep as a source of health; selecting the right patient; receiving a diagnosis and treatment that are unique to the patient; and, ultimately, optimizing the care circuits and management requirements. Outline some fundamental factors that should be taken into account before switching from clinical care to TM. These factors include gradual incorporation, keeping in mind that it is not always necessary in all care settings involved in patient management, and the need for TM to support clinical management activities. Due to the various characteristics of the studies, not all of them have come to the same findings. The way patients and professionals engage with healthcare systems is being revolutionized by the use of connected health technology (eHealth). These technologies can be employed in a variety of contexts, including accessing clinical information, promoting healthy lifestyles, and even interacting with clinical follow-up of different patient groups, particularly chronic cases that place a significant strain on healthcare systems. The modification that is now being implemented includes 34-36 TM, which may be helpful. As was already mentioned, the personalization of patients in the process is crucial. The numerous TM operations. About positive pressure apparatus in this instance. Remembering that the technological solutions currently in use can monitor and control CPAP and NIV equipment is connected via Bluetooth, cellular or other modems, or Wi-Fi to platforms or information systems hosted on remote servers that provide suppliers, patients, and clinicians with data, in a setting with the proper legal set-up, is important for understanding the various concepts. We will cover two topics in this section: first, the key benefits of ICT and the opportunities it provides for healthcare professionals, service providers, and patients, and second, what the future of technology holds for us. Regarding the first point, ICTs give the doctor access to complete information on the apparatus being used (pressure, leaks, residual events, and compliance). Additionally, the prescription can be changed remotely in cases like CPAP. Remote parameter changes in NIV are not now categorically allowed in all patients, however, this option will likely soon be available in non-serious cases. To ensure a rapid interchange of information, suppliers and service providers need to collaborate with medical experts. This will increase the amount of data that is accessible online, which will make it easier to efficiently redistribute resources and procedures the patient must be actively involved in the management of their illness. They must be empowered to set their own goals (self-control) and receive precise information on the progress of their therapy to take appropriate corrective action if necessary. This will increase compliance. After describing the possibilities of the present, we might consider what the future of technology will offer. Patients must share responsibility for the management of their diseases, as was previously stated. They will have better interactions with healthcare professionals, vendors, and service providers, yet it is crucial to personalize care and create user-friendly technologies.

Today, the emergence of apps is another beneficial option for getting data from the equipment as well as for the clinical follow-up of subjects. New training models that have been introduced among the numerous players participating in the procedures should serve as the foundation for this new connection. The use of tele monitoring will be accompanied by the production of vast volumes of data (big data) from numerous sources that will require better procedures and handling of subjects in diverse contexts, i.e., to customize treatment, as customized cluster therapy moves toward it. Technology will play a crucial role in the overall management of SDB, but it should be built on collaboration, information sharing, and shared accountability amongst service providers, suppliers, patients, doctors, and managers of the health system. The current problem is to integrate innovation into SDB within a suitable legal and regulatory framework with a suitable amount of payment, probably depending on results and service quality. Only with a thorough grasp of traditional equipment can TM be properly understood in the context of current CPAP technology. The functioning of modern devices has significantly improved, and they also have a lot of telematics characteristics. Ever-smaller devices with leak correction and memory cards that transfer data for CPAP monitoring are becoming available because of the equipment's recent, rapid development (leaks, residual events, pressures, and compliance). Additionally, new features have been created, including the ability to change various parameters remotely and more practical ways of distributing flow. The technology has developed enough to allow for several telematics interventions.

Standardized practices and fresh ideas for patient management. Since testing in hospitals is more expensive and less "real" because the individual is not in their typical environment, it is possible to move home diagnostic procedures on the internet. Additionally, the use of smartphones with integrated sensors (such as a pulse oximeter) can record breathing motions or positions in addition to O2 saturation data. New skin sensors were utilized to collect many of the signals studied during conventional sleep tests. These sensors were telemetrically attached to a laptop and discussed several very distinct choices. The AASM asserts that medical personnel has the same obligations to their patients during telematics investigations that are simplified as they do during conventional trials. There are currently several telematics choices accessible for remote education and support concerning training and certification. Points must finally be stressed. First is the requirement that Thisbe taught in colleges, generally and specifically for any entity where it is necessary. Second, new equipment alternatives need to be taken into account, such as the potential for registering several recordings throughout the night. Recent years have seen a significant improvement in NIV devices as well as the addition of additional functionalities. For patients with hypoventilation due to a variety of conditions (including neuromuscular and thoracic disorders, obesity syndrome with or without SAHS, and others), home NIV is a well-established treatment. The typical first step is an outpatient visit followed by training and adaption to reach the right comfort levels. NIV can be started remotely in the patient's home, according to certain writers. The majority of subjects requiring NIV are complex, and it should be emphasized that nighttime NIV may result in leaks, asynchrony, central events, glottis closure, changes in upper airway resistance, or secretions.