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Case Report

Open Ac<u>cess</u>

Telehealthcare in Chronic Obstructive Pulmonary Diseases

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Abstract

A study showed that the quality of spirometry performed by non-professionals improved by means of at distance collaboration between primary care professionals and lung function specialists. Clinical benefits have been shown also in severe Chronic Obstructive Pulmonary Disease patients with comorbidities. In patients with chronic respiratory failure a tele-assistance program resulted in reduction in hospital admissions, General Practitioner calls, and in costs. A study in Chronic Obstructive Pulmonary Disease patients with chronic respiratory failure on long-term oxygen, reported that a tele-medicine program alone and with greater efficacy when added to non-invasive ventilation reduced the exacerbations rate.

Keywords: Spirometry; Tele-medicine program; Hospital admissions; Health related quality of life; Asthma control

Introduction

Another small study indicated an association with reduction in hospital and emergency department admissions, and hospital length of stay. Recent research did not confirm that these systems are more effective and less expensive than standard care [1]. In a six month crossover randomised controlled trial in patients with chronic respiratory diseases, addition of tele-monitoring to standard care did not improve the time to next hospitalisation or health related quality of life, whereas it increased hospital admissions and home visits. A systematic review did not find any conclusive evidence for the effectiveness of telephone follow up alone or with other tools in reducing readmissions in patients with chronic diseases [2]. A recent systematic review reports that only three out of the eighteen studies fulfilling the criteria for inclusion, found significant improvements in health related quality of life with tele-medicine. Furthermore, the suggestion that tele-medicine could encourage the Chronic Obstructive Pulmonary Disease patients self-management was not confirmed [3]. Tele-health has been used to support self-management of long-term conditions such asthma. Positive results have been reported. A systematic review and meta-analysis from three randomised controlled trials using different technologies showed an improvement of asthma control, though the clinical effectiveness of the used apps, typically incorporating multiple features, varied. The feasibility of tele-assistance for neuromuscular diseases patients with impaired cough capacity was assessed in a pilot study [4].

Methodology

Patients' respiratory signs and symptoms were recorded at home and transmitted to a remote control centre and chest physiotherapy was prescribed and modulated accordingly. This modality was associated with reduced hospitalisations and emergency room admissions [5]. Use of tele-medicine is relevant in those neuromuscular diseases patients under home mechanical ventilation. Approximately millions of patients worldwide require life support in intensive care units each year. Advances in management have improved their mortality and morbidity. As a consequence the prevalence of voluntary action indications is increasing in people with chronic respiratory failure due to advanced diseases such as Chronic Obstructive Pulmonary Disease, restrictive thoracic diseases, and neuromuscular diseases [6]. The last reported, and underestimated prevalence of European patients requiring home mechanical ventilation is six per population. More recent Canadian data report prevalence, whereas another survey reports prevalence's in Australia and New Zealand, respectively. The prevalence of home

mechanical ventilation in Catalonia, Spain is reported. These patients have poor outcomes, despite high medical resource consumption [7]. The need to reduce health care costs and to improve safety has developed tele-monitoring programs for voluntary action indications. A European Respiratory Society Task Force produced a statement on accepted indications, follow-up strategies, equipment, facilities, legal and economic issues of tele-monitoring of these patients. Variable models of care exist for voluntary action indications, a tele-monitoring program might be a key element in home mechanical ventilation organisation but it is difficult to assess without considering it in the frame of the comprehensive management of these patients in each country [8]. Pulmonary rehabilitation is suggested for the vast majority of Chronic Obstructive Pulmonary Disease patients. As a consequence to fulfil all needs, health care systems should face relevant organisational problems and resources consumption. Tele-rehabilitation might offer a valid aid. Tele-rehabilitation uses different models of services. Patients may perform exercises at home under supervision by a physiotherapist who may prescribe and change strategies and settings at distance [10]. It has been shown that supervised home training and counselling patients may be associated with safety, feasibility and benefits for severe Chronic Obstructive Pulmonary Disease patients. Home-based maintenance tele-rehabilitation was found to be equally effective to hospitalbased, outpatient, maintenance pulmonary rehabilitation, in reducing acute exacerbations and hospitalizations and the risk for emergency department visits. Nevertheless, another study, compared with the standard rehabilitation, did not find any significant improvement in Chronic Obstructive Pulmonary Disease patients equipped with a tablet after few weeks of rehabilitation [11]. Any application of tele-medicine must be considered a medical act, therefore there are legal problems with tele-medicine still lacking shared international and national solutions. Therefore, users must use precautions in order to avoid problems such as, At distance consultation between patient/family and staff or among

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Discussion

With the large diffusion of this technology, law cases will increase, therefore, National and European governments should promote common, ethical, legal, regulatory, technical, and administrative standards. The economical impact of tele-medicine has been evaluated in a meta-analysis indicating a decrease in hospitalization costs and additional savings [12]. A systematic review concluded that synchronous or real time video communication was cost-effective for local delivery of services between hospitals and primary care. Nevertheless, in current literature reports of costs are inconsistent and often obtained from studies of poor quality. As a consequence decision-makers may have difficulties in introducing this service in health systems. However, to evaluate the real cost/effectiveness of any new method of care such as tele-medicine, the definition of standard therapy in each study must be specified in the frame of the different home care organisations of each country [13]. Problems Patients age, education, experience in technological devices, cognitive, motor and visual abilities or deficits, phonation and speech abilities, their families and home environment, play an important role in the use of technologies of tele-medicine programs. The training to such technologies and programs should be directed to caregivers and patients in order to make them able to act in accordance with predefined protocols. The increased life expectancy of worldwide population results, and will result even more in the next future, in high prevalence of chronic and non-communicable diseases, as well as of complex patients with chronical criticities also due to respiratory diseases. As a consequence, the health care systems of the industrialised countries will have to face high burden also in the attempt to fulfil somehow unrealistic citizen's expectations in the age of welfare decline [14]. On the other hand, also governments of low-and lower-middle-income countries have to face the increasing health needs of their populations, often in rural/remote areas. With the purpose of reducing health care related expenses and delivering health facilities as much as possible, a prospective solution might be to care patients at home with the help of wearable technologies. Wide application of Information and Communication Technologies to health care organisations and advances in sensor and data transmission technology has allowed the development of tele-medicine based programs of care. Tele-medicine has been defined as the distribution of health services in conditions where distance is a critical factor, by health care providers using Information and Communication Technologies to exchange at distance information useful for diagnosis. We can go beyond this definition as tele-medicine might be useful also to improve the delivery of and patient's compliance to chronic management. Information and Communication Technologies applied to health care and advances in sensor and data transmission technology allowed telemedicine based programs of care also for patients with respiratory diseases. Different sensors, transmission devices and interventions are used in tele-medicine for some indications. Patients suffering from Chronic Obstructive Pulmonary Disease, asthma, neuromuscular diseases, ventilator assisted individuals and those undergoing pulmonary rehabilitation programs may benefit from this approach. The legal problems are still unsolved. Economic advantages for health care systems, though potentially high, are still poorly investigated. Despite the hopes, we need more evidence before this modality can be considered as a real progress in the management of patients with respiratory diseases. On one hand, these technologies can improve the care of patients with difficult access to services, particularly those in rural/remote areas like in Indonesia, on the other hand, there is the risk that they will be used only to reduce standard services in health systems of developed countries. While seeking savings through these new perspectives, health care organisations should not forget the quality of care.

Conclusion

Tele-medicine should not be considered only to save resources at the price of reduction in quality and safety. These technologies can improve the care of patients with difficult access to services, particularly those in rural/remote areas like in Indonesia, a country with more than seventeen thousand islands and with one of the highest prevalence of smoking habit. On the other hand, this approach might be an alibit to reduce standard services in more developed health systems. Despite the hopes in tele-medicine as a means of patients care, we need much more evidence before this modality can be considered as a real improvement in the management of patients.

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None

Conflict of Interest

None

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