Telecardiology for patients with acute or chronic cardiac complaints: The ‘SHL’ experience in Israel and Germany

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Abstract

Objective: To assess the impact of a telemedicine program in which electrocardiogram (EKG), body weight and/or blood pressure are measured at home and medically trained personnel judge the transmitted data and counsel the patients by telephone.

Method: We systematically studied the outcome and cost-effectiveness of the cardiac programs carried out by Shahal (SHL) during the past 19 years.

Result: Most patients (85%) with acute complaints resembling coronary artery disease, could be reassured, representing a savings of about €677,000 per 10,000 members/yr in Israel in 1989, and a marked reduction in patient delay to 44 min (median). In chronic heart failure a 66% reduction in hospitalisation days was observed, together with an improvement in quality of life. A large Healthcare Insurance Company in Germany (Taunus BKK) has calculated that it can save at least €5 million per year with the use of such services.

Conclusion: Disease management with concomitant telemedicine for coronary artery disease and chronic heart failure is safe and effective and has a huge potential for cost savings, improvements in quality of life and in prognosis of heart disease.

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1. Introduction

The increase in elderly and chronically ill patients will pose an increasing burden on the capacity and financing of the healthcare systems in western countries. To overcome these problems it is mandatory to install disease management programs with the aid of telemedicine [1]. Disease management is a system of coordinated healthcare interventions and communications for populations with conditions in which patient self-care efforts are significant [2]. Disease management supports the physician or practitioner/patient relationship, emphasizes prevention of exacerbations and complications utilizing evidence-based practice guidelines and patient empowerment strategies with the goal of improving overall health. Personal telemedicine is the transmission of medical data via telecommunication networks by an individual patient from a remote location to a medical call center for the purpose of monitoring, diagnosis, and patient and disease management. It increases quality of care at lower costs and enhances patient education and compliance. On the basis of frequent monitoring in the home situation, decreases in the condition of the patient can be detected early, thus enabling timely interventions by dedicated medical personnel. It not only provides the patient with a higher level of safety and quality of life, but also decreases the workload of the medical support systems. Finally, telemedicine truly enables the patient to make the transition to demand-driven care. This article focuses on the application of disease management programs.
with a telemedicine component for cardiovascular diseases i.e. acute coronary syndromes and chronic heart failure with remote monitoring of vital parameters in the home situation.

2. Method

We systematically studied the outcome and cost-effectiveness of the cardiac program as carried out by the internationally operating telemedicine-services provider SHL (Shahal, http://www.shl-telemedicine.com/) and report in this article an interpretive review of the results obtained within the past 19 years. It is the goal of SHL to offer (1) the patient with (fear of) coronary artery disease reassurance or (acute) interventions in case of complaints or emergency through the assistance by well trained medical personnel, available during 7× 24 h at a remote monitoring centre, or at the patients home, after dispatch of an ambulance and (2) the patient with chronic heart failure a totally integrated, protocol-driven, pro-active care.

3. Results

3.1. Coronary artery disease

Coronary artery disease gives rise to episodes of acute chest pain, which may or may not result in acute myocardial infarction. Already in 1995 interesting observations have been published from the telemedicine service program of SHL with patients who were trained to use a device for trans-telephonic transmission of an electrocardiogram (EKG) in case of acute complaints [3]. It could be proven that the time elapsed between onset of cardiac symptoms and the decision to call for medical help was markedly shortened to 44 min (median) and that in the majority of calls an emergency pick up by an ambulance could be avoided and thus a fair number of emergency room visits too. Therefore the SHL experience proved to be a double edged sword, reassuring most (85%) of the patients calling in, and helping those truly in need faster (15%) to be a double edged sword, reassuring most (85%) of the patients calling in, and helping those truly in need faster (15%) using a standard 12-lead EKG device. In parallel an EKG was also recorded by a small and portable unit, capable of transmitting 12-lead EKG’s via a standard telephone line, and this was transmitted to the call centre of the Personal HealthCare Telemedicine Services GmbH (PHTS), a fully owned subsidiary of SHL at Düsseldorf (Germany). In a retrospective analysis, each lead of the transmitted EKG was compared with the on-site 12-lead EKG with regard to ST-segment changes and final diagnosis. In all 37 patients with AMI and acute ST elevation on the EKG, this diagnosis was also correctly established on the basis of telephone-transmitted EKG’s. In the remaining 33 patients with documented AMI, no new or presumed new ST-segment elevations were present.

3.2. Chronic heart failure

Chronic heart failure (CHF) is a typical example of a chronic disease that qualifies for a disease management program with telemedicine support and self-monitoring at the home situation. It is estimated to affect about 2% of the population and is characterized by acute episodes of shortness of breath, due to fluid overload. In 1997, it was reported that intensive contact by telephone, on the basis of consensus guidelines was able to increase patient compliance to therapy and to reduce emergency room visits for heart failure by 67% and hospitalisation rates by 87% [8]. Thereafter several studies demonstrated fewer hospitalisations and fewer total days of hospitalisation by implementing homecare strategies [9–13]. In 2001, a pilot study was published in which 10 patients with CHF were monitored with fully automated data transmission of blood pressure, heart rate and weight, to a central server, proving that this concept could work in daily practice [14]. Recently, Roth ea. published a larger series of 118 patients with CHF who’s blood pressure, heart rate and weight were transmitted automatically to a medical service centre of SHL, to be monitored with the aid of a software algorithm, in conjunction with a 24 h emergency call service on demand in case of medical complaints, and an elective biweekly call from nursing staff to promote adherence to therapy [15]. When comparing data with those obtained retrospectively from the same group during the preceding year, a 66% reduction in hospitalisation days was observed, together with an improvement in reported quality of life. Meanwhile, this program has
taken off in Germany, where a telemonitoring service centre has been established at Düsseldorf. In this centre, comparable results are obtained. The Healthcare Insurance Company "Taunus Betriebskrankenkasse" (http://www.bkk.de/) has calculated that it may generate a net savings of at least € 4.7 million per year on various medical and related costs with the use of such services for their members [16,17]. From an economic point of view the use of telemedicine has recently been recommended as one of the possible options to increase labour-productivity in healthcare in The Netherlands [18].

4. Conclusion

We conclude that a longstanding experience has been built up by SHL in disease management with concomitant telemedicine for coronary artery disease and chronic heart failure, that it has been proven to be safe and effective and that it has a huge potential for cost saving, improvements in quality of life and in prognosis of heart disease.

REFERENCES