

- [9] Darsalia V, Ortsäter H, Olverling A, et al. The DPP-4 inhibitor linagliptin counteracts stroke in the normal and diabetic mouse brain: a comparison with glimepiride. *Diabetes* 2013;62:1289–96.
- [10] Braunersreuther V, Jaquet V. Reactive oxygen species in myocardial reperfusion injury: from pathophysiology to therapeutic approaches. *Curr Pharm Biotechnol* 2012;13:97–114.
- [11] Rodrigo R, Fernández-Gajardo R, Gutiérrez R, et al. Oxidative stress and pathophysiology of ischemic stroke: novel therapeutic opportunities. *CNS Neurol Disord Drug Targets* 2013;12:698–714.

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Remote tele-medicine cardiologist support for care manager nursing of chronic cardiovascular disease: preliminary report



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Care Management is an emerging concept that refers to a set of evidence-based, integrated clinical care activities that are tailored to the individual patient, and that ensure each patient has his or her own coordinated plan of care and services. The care plan, which is developed collaboratively by the patient and care providers, is designed and implemented to optimize the patient's health status and quality of life.

Nurse based care management is especially suited for chronic disease and elderly frail patients [1]. Feasibility and effectiveness of a disease and care management model in the primary health care system for patients with heart failure and diabetes (Project LEONARDO) have been previously reported [2].

Implementation of tele-medicine, however, could probably further improve the overall quality of health care, specially with cardiovascular disease [3–6]. Tele-medicine implementation could also be useful in reducing health care costs [7].

The LEONARDO project was extended and continued by the NARDINO project, a chronic disease management program based on care manager nursing which were also supported by a remote telemedicine hub. Remote tele-medicine support provided real-time electrocardiogram interpretation, which we hereby report as preliminary data.

So far, the NARDINO project involved 2208 subjects (1032 male, 1176 female, 58% older than 65 years), located in remote areas across Apulia (Southern Italy, 4,050,300 inhabitants and 19,358 km²). The project was started in 2012 when enrollment of patients began. Thirty-five care-manager nurses were involved in the projects (21–72

patients per care manager nurse). Care managers served as a bridge between physicians, specialists, and patients, collaborating with the patients' doctors while working directly with patients. Patients enrolled were subjects with established cardiovascular disease (CVD), diabetes, heart failure, and CVD risk factors. Patients participating in Project NARDINO would work with the care manager assigned to their GP or family doctor. All patients received: (a) initial and follow-up assessments conducted by the care manager in order to establish baseline measures of health measures and behaviors and provide a mean for tracking patient progress during the study, (b) an individualized care plan which reflected the treatment recommendations of their doctor and specialists as well as personal health goals chosen by the patient, (c) educational materials matched to their specific conditions or risk factors, (d) assistance with service coordination including easier access to specialist care, and (e) regular, ongoing one-on-one health coaching sessions offering opportunities to address individual patient concerns and goals. Throughout the course of treatment, the care manager would provide support to the patient in implementing actions based on the GP recommendations or in taking steps to make the lifestyle changes needed to improve health or lower health risks. Throughout the project care managers helped to coordinate patient care by assisting the patient in arranging for visits to specialists and supporting the patient in the use of other community resources. The care manager also helped to manage the patient follow-up appointments with the GP and to schedule case conferences based on the individual patient's needs.

Patients were excluded from participation in Project Leonardo if they: refused or did not sign the consent form or revoked consent, were unable to communicate in Italian, were unable to communicate over the telephone, had one or more of the following complex medical conditions (end-stage renal disease, HIV/AIDS, sickle cell anemia, transplant recipient, active psychoses, hemophilia, advanced cirrhosis, spinal cord injury, continuous drug dependence, congenital heart disease, current pregnancy, congenital adult cardiopathy, terminal cancer, moderate to severe dementia, life expectancy less than one year).

All care managers participating in the NARDINO project were provided with a CardioVox P12 12-lead electrocardiogram recorder (Aerotel™, Holon, Israel) (Figs. 1–2): the devices may record a complete 12-lead ECG which is read by a cardiologist available 24/7 after (mobile-)telephone transmission to a unique regional telemedicine support “hub”, located in Bari, capital city of Apulia. Care managers may be shown back ECGs on smart-phones connected with tele-cardiology

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Fig. 1. Tele-cardiology device for remote electrocardiogram recording and its use.

hub. Logistic support for telemedicine hub was provided by Cardio-online Europe S.r.l., Bari, Italy, as described elsewhere [4,6,8]. A cardiologist available 24/7 within tele-cardiology hub promptly interprets the electrocardiograms sent by remote care managers from all over Apulia. In case of cardiovascular urgencies, the patients are immediately addressed to the nearest hospital for appropriate treatment.

When deemed necessary, an ambulatory electrocardiogram was recorded with a "Evo" device (Del Mar Reynolds Spacelabs, Hertford, United Kingdom), capable of remote transmission by internet connection to the telemedicine hub, where records are interpreted by a cardiologist. Similarly, ambulatory blood pressure monitoring was performed when required with an "Ultralite" device (Del Mar Reynolds Spacelabs, Hertford, United Kingdom).

Tele-medicine service is provided since October 2004 by Cardio-online Europe S.r.l., a telemedicine company-certified UNI EN ISO 9001:2008 (quality certification) and UNI CEI ISO/IEC 27001:2006 (security data certification). The tele-cardiology hub center (Fig. 3) serving the entire regional territory, operative 24/7, has two cardiologists on duty for electrocardiogram reporting, 12 computer terminals, 25 telephone lines, 2 call center operators active 24/7, and an emergency power system in case of electrical power outage: 20 cardiologists alternate on duty.

All center services and the entire network are shielded from virus threats by a combination of hardware and software firewalls, and a comprehensive antivirus suite capable of real-time scanning and updates, in addition to software back-up procedures. A comprehensive network management program ensures that all systems have real-time updates and that the latest security patches are installed as soon as they are released.

All data are electronically stored onto computers using a unique identification number for center and individual, under the provisions of the Italian Privacy and Personal Information Protection Act (D. Lgs. 196/2003).

Electrocardiograms were recorded by care-manager nurses at personal discretion and in any case of suspected heart disease.

The study was authorized by local Health Authority and agrees with the declaration of Helsinki.

Until December 2013, 813 electrocardiograms were interpreted by tele-medicine hub for the NARDINO project, with an electrocardiogram every 2.7 patients. Fifty-six percent of subjects examined by tele-medicine electrocardiograms were male, mean age was 58 ± 19 years.

Main findings at remote tele-medicine electrocardiogram/consultation were ST anomalies (2.1%), Q-waves (1.8%), left ventricular hypertrophy (0.7%), chronic atrial fibrillation (2.1%), newly found atrial fibrillation (0.7%), junctional rhythm (0.1%), pacemaker dysfunction (0.1%), and artifacts (0.1%) (Fig. 3). Two cases of ST-elevation suggestive for acute myocardial infarction, one also with mirror ST-depression, were also detected.

On the basis of these electrocardiogram findings, hospitalization was disposed in 0.1% of cases, cardiologist referral in 1.4%, echocardiography in 0.5%, ambulatory electrocardiogram 24-hour monitoring in 0.1% (Fig. 4). ST anomalies were present in 2.3%, with suspected ischemia in 0.9%.

In the same period 403 ambulatory electrocardiograms and 105 ambulatory blood pressure monitoring controls were performed. The findings were normal in 33% and 21% respectively, while an urgent hospitalization or a cardiologist referral was required in 8% and 1% respectively, on the basis of severe abnormal results.

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