



Efficacy of a nurse-led email reminder program for cardiovascular prevention risk reduction in hypertensive patients: A randomized controlled trial[☆]



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ABSTRACT

Background: Many strategies have been evaluated to improve the prevention and control of cardiovascular (CVD) risk factors. Nursing telephonic and tele-counseling individualized lifestyle educational programs have been found to improve blood pressure control and adherence to lifestyle recommendation. This study tested the efficacy of a nurse-led reminder program through email (NRP-e) to improve CVD risk factors among hypertensive adults.

Methods: All participants received usual CVD prevention and a guideline-based educational program. Subjects in the NRP-e group also received weekly email alerts and phone calls from a nurse care manager for 6 months. Emails contained a reminder program on the need for adherence with a healthy lifestyle based upon current guidelines. Follow-up visits were scheduled at 1, 3 and 6 months after enrollment; randomization was made centrally and blood samples were evaluated into a single laboratory.

Results: The final sample consisted of 98 (control) and 100 (NRP-e) subjects (mean age 59.0 ± 14.5 years; 51.0% males). After 6 months, the following CVD risk factors significantly improved in both groups: body mass index, alcohol and fruit consumption, cigarette smoking, adherence to therapy hours, systolic and diastolic blood pressure, fasting blood glucose, low-density lipoproteins (LDL) and total cholesterol, triglycerides, and physical activity. In the NRP-e group, however, the prevalence of several behaviors or conditions at risk decreased significantly more than in the control group: obesity (−16%), low fruit consumption (−24%), uncontrolled hypertension (−61%), LDL (−56%), and total cholesterol (−40%).

Conclusions: The NRP-e improved a range of CVD risk factors. The program had low costs, required only an average of <20 min per day in addition to normal practice, and may deserve further evaluation for the inclusion among existing care management approaches.

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[☆] This clinical trial was registered on <http://www.clinicaltrials.gov/> (PRS no: NCT01823588 of date 02.04.13).

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What is already known about the topic?

- The majority of cardiovascular diseases are caused by risk factor that can be modified or controlled: hypertension, overweight/obesity, tobacco use, lack of physical activities, elevate triglycerides, cholesterol and glucose, and unhealthy diet.
- Several strategies have been developed to improve cardiovascular disease management and prevention, such as nursing telephonic and tele-counseling educational programs to develop blood pressure control and adherence to healthy lifestyle.

What this paper adds

- This randomized clinical trial demonstrate the benefit of the introduction of a nurse-led reminder program through email (NRP-e) in addition to usual care, on the primary prevention of cardiovascular diseases.
- This study provide evidence to support that a nurse-led reminder program through email (NRP-e) significantly improves several biological parameters and lifestyle habits in hypertensive patients, such as blood pressure, BMI, alcohol consumption, cigarette smoking, physical activity, fruit consumption, cholesterol, and triglycerides.

1. Introduction

Cardiovascular diseases (CVDs) lead to more than 17 millions of deaths worldwide during 2008, thus being the primary cause of death and disability (WHO, 2007, 2011). Several of the major risk factors of CVD can be modified, including cigarette smoking, high blood pressure, triglycerides, cholesterol and glucose, overweight and physical activity (Mancia et al., 2007). Even modest but sustained lifestyle changes, including diet (Whelton et al., 1998), physical activity (McKechnie and Mosca, 2003), weight control (Finer, 2003; Whelton et al., 1998), alcohol consumption (Campbell et al., 1999), drug therapy (Kostis et al., 1992), and smoking habits, can substantially reduce CVD morbidity and mortality (Capewell et al., 2010).

To date, a number of strategies have been developed to improve CVD risk factors management and prevention (Franco et al., 2011), including patient self-monitoring, educational interventions directed to patients or health professionals, organizational initiatives to improve the delivery of care (i.e. case management), appointment reminder systems, and mixtures of the above (including nurse or pharmacist-led care) (Carter et al., 2009; Denver et al., 2003; Glynn et al., 2010; Page et al., 2005). To date, however, the efficacy of most interventions has not approached 50% for dichotomic outcomes, or clinically relevant improvement for continuous outcomes (Fleming and Godwin, 2008). Recent studies on CVDs prevention showed that nursing telephonic disease management (Brennan et al., 2010) and tele-counseling (Artinian et al., 2007; Wai Chiu and Yuet Wong, 2010) individualized lifestyle educational programs may improve blood pressure control and adherence to healthy lifestyle (Morris et al., 2009). Specifically, nursing telephonic disease management program is a comprehensive strategy to improve

hypertensive patients' knowledge and support lifestyle changes based on detailed telephonic educational sessions and telephonic assessments (Brennan et al., 2010). Tele-counseling educational programs (Artinian et al., 2007; Wai Chiu and Yuet Wong, 2010) provide services for patients' health maintenance through telephone follow-up, with the advantages of promoting accessibility for several patients who lives far away from clinics. Despite this evidence, a review of randomized trial showed that most of the lifestyle-oriented interventions in primary care have been scarcely effective in changing factors related to cardiovascular risk (Fleming and Godwin, 2008).

Computer-based patient education has also been suggested as a potentially effective strategy for the improvement of patients' outcomes. It is focused on the development of web-based information delivery strategies, online patients' support and education (Lewis, 1999, 2003). Internet-based educational strategy allows patients to refer to daily available information instead of less frequent face-to-face contact with health professionals. Moreover, as an educational tool, the computer provides other advantages, including a private learning environment and immediate reinforcement of previous learning sessions (Lewis, 1999). As computer-based educational strategies provide more interactive information and education to patients at lower cost, they may have a pivotal role in supporting patients' understanding of their care plan (Lewis, 1999, Wantland et al., 2004). In addition, new strategies of computer-based intervention, which focused on self-management education, were found to be more beneficial for risk factor reduction in secondary CVD prevention (Goessens et al., 2008).

However, to date no trial specifically evaluated the efficacy of nurse-led reminder program through email (NRP-e) in addition to usual medical care for the management of cardiovascular risk factors.

We thus carried out a randomized controlled trial to evaluate whether a NRP-e may improve the existing primary prevention strategy for the management of the main CVDs risk factors in hypertensive patients.

2. Methods

2.1. Study design

From October 2011 to May 2012, we carried out a randomized controlled trial in an Italian Hypertension Primary Care Center. The study protocol was registered (NCT01823588) and approved by the Ethics Committee of the University of the Abruzzo Region.

2.2. Participants, recruitment and randomization

To be eligible, all subjects had to be hypertensive (on active treatment for hypertension, or systolic blood pressure ≥ 140 mmHg; or diastolic blood pressure ≥ 90 mmHg). Other inclusion criteria were: speaking and reading Italian, having an active phone number and an email address, and providing a signed informed consent. Exclusion criteria were: mental illness, nursing home institutionalization, pregnancy, previous cardiovascular

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