

gMALL LETTER TO THE EDITOR

Mass Screening and Intervention by Mass Communication The HAPPY Program

Cardiovascular diseases remain the number one cause of morbidity and mortality, both in the developed and developing countries, and in men and women alike. It is expected that these numbers will continue to increase in the coming decades due to escalating proportions of obesity and the aging population, especially in the low and middle income group countries. The magnitude of this health care problem calls for innovative measures to improve cardiovascular health at population level. HAPPY (Heart Attack Prevention Program for You) program was started in March 2007 with the objective of cost-effective mass screening for the likelihood of adverse cardiovascular events, mass communication for educating the community for prevention of cardiovascular disease and recommendation of therapeutic intervention wherever appropriate (www.happyglobally.com). The first program was started in The Netherlands.

HAPPY sought to utilize the most effective means of mass screening and mass communication in different countries. In the developed country, we used internet-based medical and lifestyle questionnaires, which after completion by participants, were collected in a central data base. The results of laboratory parameters and blood pressure testing were added to the central data base for each participant. Laboratory and blood pressure assessment was performed either by regular health care professionals or through large-scale health fairs; the latter allowed for mass screening of 250 participants per hour. Subsequently, the data base of the questionnaires and physical health screening was linked to health advisory software, which generated personalized advice for every single participant based on the medical and lifestyle results. The personalized advice was sent to participants by either mail, or generation of a personalized website. We used e-coaching and communication to promote a healthy lifestyle in follow-up.

HAPPY study was approved by the Institutional Review Board and written informed consent was obtained from all participants prior to their joining the study. Following mass screening in 1000 participants, we conducted a 3-month e-coaching program. We assessed the cardiovascular risk score by the PROCAM based questionnaire, and blood pressure (BP), total, HDL and LDL-cholesterol, triglycerides (TG) and glucose levels. Blood samples were obtained after an at least 12-h overnight fast. Nine hundred HAPPY volunteers attended the cardiovascular health fair in March 2007. Of these 900 participants, 595 (mean age, 51 years; 295 men and 300 women) took part in the 3-month program and joined the second cardiovascular health fair in June 2007. The risk factor profile included 14.7% smokers, 6.8% diabetics, and 15.9% on antihypertensive drugs. In addition, 26.2% had a family history of coronary artery disease, and only 26.4% indulged in exercise >4 times per week.

Starting 2 weeks after the health fair, all participants received their PROCAM scores and related health advice through e-mails. Participants with a low PROCAM risk score (0–5%) were advised to continue a healthy lifestyle and to repeat cardiovascular risk assessment in 5 years. Participants with an intermediate risk score (5–20%) were advised ways to improve risk factor profile and follow-up risk score assessment within 1 year. Participants with a high risk score (>20%) were advised to either visit their general practitioner or the University Hospital for further assessment. For intervention in lifestyle, personally relevant feedbacks on participants' health fair tests and their lifestyle behaviors were provided. Subsequently, all participants received bi-weekly newsletters containing lifestyle advice. All communications were sent by e-mail to all participants during this 3-month period. The lifestyle advice consisted of recommendations as to exercise, healthy diet, and smoking cessation. In addition, all participants were invited to join either running or Nordic walking clinics on a weekly basis.

Of 595 participants, 50% had elevated BP (systolic >140 and/or diastolic >90) at the first health fair. At the second health fair in June 2007, this number had decreased to 30%. Mean systolic BP decreased from 139 mmHg in to 131 mmHg ($p < .0001$); mean diastolic pressure decreased from 82 to 78 mmHg ($p < .0001$). In addition, 76% of participants on blood pressure lowering medication had elevated BP, which lowered to 54% at follow-up. Of those not taking BP lowering medication, a

surprisingly high number, 46% had elevated BP and this decreased to 26% after the intervention. Total cholesterol levels decreased from a baseline value of 215 mg/dl at baseline to 206 mg/dl ($p < .0001$) after the internet intervention. LDL-C decreased from 140 to 136 mg/dl ($p = .001$); triglyceride levels decreased from 98 to 89 mg/dl ($p = .001$). Mean weight of the participants was 77.4 kg at baseline and decreased to 76.1 kg ($p < .0001$) upon follow up. During the first cardiovascular health fair in March 2007, mean PROCAM risk score was 6.3%. At baseline, 66% had a low, 26% intermediate, and 8.0% had a high PROCAM risk score. At 3-month follow up, the mean PROCAM risk score had decreased to 5.5% ($p = .000$). In addition, the numbers of participants with high PROCAM risk score decreased to 6.0%. After 1-year e-coaching and advisory program, a 21% net reduction in 10-year risk score was observed, based predominantly on blood pressure and LDL lowering, and elevation in HDL.

This study showed that cardiovascular risk screening of large numbers of participants was feasible, and that personalized mass communication through internet effective in decreasing the 10-year risk of myocardial infarction. More than 98% participants reported to have read the information that

was sent via e-mail. To explore the opportunities and challenges in developing countries, a HAPPY program was recently initiated in Sirsa, a rural and semi-urban area in North-Western India. The risk factors and coronary disease is increasing in India, and the rate of obesity in the rapidly growing middle class is rising at an alarming pace. In line with the programs in developed countries, mass screening of the population is combined with health communication. Major challenges in India are costs and illiteracy. To overcome these hurdles, HAPPY has organized large health fairs with the purpose of mass education of the public. A revered spiritual mentor, Saint Gurmeet Ram Rahim Singh Ji has taken upon himself to educate the HAPPY participants in Sirsa about lifestyle changes and behavioral modifications through his sermons (www.happyglobally.com/projects/project-true-happy). A total of 14,000 subjects have been recruited and the biochemical investigations are on way.

*Leonard Hofstra, Eduard Laufer, Froukje Dijk,
Marja van Dieijen, Hein J.J. Wellens, Jagat Narula
University of Maastricht, The Netherlands; and
Mount Sinai School of Medicine, New York, NY, USA;
leonard.hofstra@gmail.com (Leonard Hofstra, MD)*