Monitoring health risk behavior of Dutch adolescents and the development of health promoting policies and activities: the E-MOVO project

Health Promotion International, Vol. 22 No. 1
doi:10.1093/heapro/dal036
Advance access publication 2 October 2006

Monitoring health risk behavior of Dutch adolescents and the development of health promoting policies and activities: the E-MOVO project

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SUMMARY

This paper describes a new way of monitoring the health status of Dutch adolescents in order to stimulate the development of health policies at school and local levels and providing individual feedback using modern technology. The project is called E-MOVO that stands for Electronic Monitor and Health Education, in which seven Regional Health Authorities and the University of Maastricht collaborate. In this project, adolescents completed an electronic questionnaire via the Internet which measured topics related to demographics, school, physical health, mental health, well-being, lifestyle, criminality and leisure time activities. These data were used for feedback at three levels. On the basis of their answers, adolescents received tailored feedback on lifestyle in a personal 'E-MOVO score', including links to relevant websites or other tailored information. The aggregated data were used to provide schools and municipalities with information on the health and well-being of their adolescent population. These data were used to encourage the development of health promoting policies and activities at both levels. This project was evaluated and is now adapted to implement at a national level.

Key words: adolescents; electronic monitor; tailored life-style information; health promoting policies

INTRODUCTION

The health status of Dutch adolescents is periodically monitored to stimulate the development of health policies at school, local and national levels. With modern technology, the same data can also be used to provide individual feedback and thereby promote a healthy lifestyle. This paper describes a project that combines both ends. The project is called E-MOVO, a Dutch acronym for Electronic Monitor and Health Education.

Since 1990, Regional Health Authorities (RHAs) have a statutory obligation to monitor the health and well-being of adolescents, in order to set priorities for health promotion activities. This includes the monitoring of important health behaviors. Dutch youngsters are like others in western societies: a lot drink excessive amounts of alcohol, more than half of them have ever smoked, they do not eat much fruit and vegetables and 75% do not meet the recommendations for physical activity (CBS, 2003; WHO, 2004). Such behaviors are associated with chronic diseases (Schram *et al.*, 2001; Ezatti *et al.*, 2002; WHO, 2003) and unfavorable trends are expected in the future.

Many health risk behaviors are acquired during adolescence and continue during adulthood, thereby affecting later health (Kelder *et al.*, 1994; Kann *et al.*, 1996; Rowland, 1996; Perry, 2000). Since today's youngsters represent the future adult population, prevention of chronic diseases focussing on health risk behaviors of adolescents is warranted.

However, monitoring such health behaviors, analyzing data and providing feedback for the development of health policies or health promoting activities at different levels require considerable time and money and involve many stakeholders. At the time of the start of the project, monitoring was not yet done electronically and did not include feedback at the individual level. This paper first outlines the E-MOVO project that facilitates monitoring, provides tailored feedback at all levels and supports the development of health policies to meet the needs of individuals, schools, municipalities and RHAs. Secondly, the evaluation study that accompanied the project to enable improvement will be presented.

THE E-MOVO PROJECT

In 2003, seven RHAs, situated in the eastern part of the Netherlands, and the Department of Health Promotion and Health Education of the University of Maastricht (UM) collaborated in the E-MOVO project. Its aim was to develop an electronic monitoring instrument to collect data on the health and well-being of adolescents that could form the basis for the planning of health promoting activities and policies for Dutch adolescents. The project organization consisted of an *advisory group* and a *coordinating group* with a subgroup Epidemiology and a subgroup Health Education. The advisory group was responsible for the red line of the project. In the coordinating group, all relevant stakeholders were represented, to promote involvement in the project (development) resulting in successful implementation (Oldenburg and Parcel, 2002). This group coordinated the development and implementation of the electronic monitor questionnaire. The subgroup Epidemiology was responsible for the development of the questionnaire, whereas the subgroup Health Education developed an implementation plan, and it organized information sessions for schools, RHAs, etc. An ICT company technically implemented the monitor.

The UM developed the tailored feedback and evaluated the project. All RHAs were involved in recruiting schools, they maintained contacts with municipalities and they wrote the reports for schools and municipalities. Moreover, RHAs took part in the development of health policies based on the data presented in the reports, both at school and at municipal levels. This is, in fact, one of their regular tasks.

The project was registered at the Dutch Data Protection Authority, which supervises the fair and lawful use and security of personal data.

THE ELECTRONIC MONITORING INSTRUMENT

The questionnaire was constructed on the basis of several existing (if possible, validated) instruments, which were used by RHAs and health institutes. It consisted of 119 questions, including items on demographics, school, physical health, mental health, well-being, lifestyle, criminality and leisure time activities. Several items were used to assess the following life-style behaviors: physical activity, smoking, fruit intake, alcohol consumption, sexual behavior and drug use. For each behavior, a score was computed that could be compared with the Dutch health norms for adolescents (Table 1). Owing to the number of health behaviors that were investigated, it was not possible to assess each behavior in depth; hence, non-validated 'short' questionnaires were used to assess individual health behaviors. Moreover, behaviors were self-reported instead of objectively measured, which may result in over- or under-reporting.

During one class session ($\sim$45 min), adolescents filled out the monitoring questionnaire via the Internet in the Fall of 2003. The advantages of using an electronic monitor are that it does not require any distribution of questionnaires or data entry, which reduces costs. Previous research, covering a broad area of health-related issues, has shown that the results of electronic questionnaires are comparable to identical paper and pencil questionnaires (Stanton, 1998; Pettit, 2002; Ritter *et al.*, 2004; Mangunkusumo *et al.*, 2005). Hence, monitoring via the Internet seemed justified. All data were stored on the same server. At the end of the monitoring questionnaire, adolescents were asked to give their email address to enable us to send them reminders to login at the E-MOVO website for the individual feedback after a few days and to approach them for the evaluation of the project.

Table 1: The Dutch health recommendations for six life-style behaviors: physical activity, fruit consumption, smoking, alcohol consumption, drug use and sexual behavior, in relation to reported behavior

Behavior	Dutch health recommendations	Present behavior in accordance with the health recommendations
Physical activity	Minimum of 60 min/day of moderate or intensive physical activities. Furthermore, twice a week the activities should be focussed on improving or maintaining the physical condition (Kemper *et al.*, 2000)	71%
Fruit consumption	At least two pieces of fruit a day (http://voedingscentrum.nl)	30%
Smoking cigarettes	No smoking, not even one puff	78%
Alcohol consumption	For boys and girls <16 years: no or little alcohol consumption (http://www.alcoholinfo.nl)	77%
	For girls ≥16 years: maximum of 2 glasses/day and ≤5 days/week. For binge drinking: ≤3 glasses/occasion and not every week (http://www.alcoholinfo.nl)	74%
	For boys ≥16 years: maximum of 3 glasses/day and ≤5 days/week. For binge drinking: ≤5 glasses/occasion and not every week (http://www.alcoholinfo.nl)	50%
Drug use	No drug use	82%
Sexual behavior	Safe sex (using a condom every time when sexual intercourse takes place) (http://www.alcoholinfo.nl)	53%

Websites and references used to present the Dutch health recommendations. For drug use and smoking behavior, the absolute norm of no risk behavior was used.

FEEDBACK AT THREE LEVELS: INDIVIDUALS, SCHOOLS AND MUNICIPALITIES

The data collected in the questionnaire were used to provide adolescents, schools and municipalities with feedback on the health and well-being at the individual and the collective level.

Individual feedback

Adolescents could log in on the E-MOVO site to obtain a personal 'E-MOVO' score. A few days after completion of the questionnaire, adolescents who had provided their email address were reminded of this possibility. The score consisted of feedback on life-style behaviors and mental health problems, tailored to answers given in the questionnaire. Tailored feedback is more useful in motivating persons to perform the desired behavior than non-tailored feedback (Brug *et al.*, 2003; Kroeze *et al.*, 2006). It also provides the opportunity to give normative feedback (i.e. a comparison between individual responses and a standard, in this case the health norm) and positive feedback to reinforce desired states. For each behavior, a color code was provided, indicating that the adolescent behaved well according to the Dutch health norm (green), that their behavior was just below the norm (orange) or that they behaved unhealthily (red). Each screen contained feedback on the persons' current behavior, the Dutch health norm and advises to change unhealthy behavior. Adolescents were encouraged to search for more information on these topics, which was facilitated by providing links to relevant websites, for instance, to the Dutch Nutritional Council, the Netherlands Institute of Mental Health and Addiction (Trimbos) or the 'Net doctor'. If adolescents had indicated to have mental health problems, they were advised to talk to a person they trust. It was also possible to click on two additional questionnaires assessing (determinants of) fruit consumption and smoking behavior in detail, after which tailored information was given related to these topics. The website had the look and feel of TMF, a popular music channel for this age group, and was pilot tested among the target population to assess whether the site and the messages were attractive for adolescents (Bartholomew *et al.*, 2001).

Feedback at the school and municipality levels

For schools and municipalities, the RHAs analyzed the data per unit (school or municipality)

and presented the aggregated data in a report. These aggregated data were compared with the total population and at risk groups were identified. This report could form the basis for the development of school (or municipal) health policies and health promoting activities. The reports were discussed at schools or municipalities, preferably in a multidisciplinary team with adolescents, teachers, school directors or municipal health officers and parents. In such teams, priorities for health policies and activities were set tailored to the needs of the schools or the municipality and based on empirical data. In some schools, the schoolBeat approach was used (Leurs *et al.*, 2005b). SchoolBeat is a six-step approach that (i) determines the health needs of the school; (ii) sets health promotion priorities; (iii) assesses the importance and changeable determinants; (iv) compiles the school health plan; (v) realizes the school health plan and (vi) evaluates the school health plan (Leurs *et al.*, 2005a). RHAs support schools in guiding the process of developing health policies and selecting appropriate health promoting activities.

EVALUATION

To evaluate why the project was successful, a process evaluation was planned (Bartholomew *et al.*, 2001). Thus, a comprehensive insight into the appreciation of the electronic monitoring instrument and the feedback at the three different levels has been obtained. All involved stakeholders participate in the evaluation. In general, the evaluation identifies facilitating and inhibiting factors to the use and dissemination of the project as a whole in order to provide recommendations for improvement and to identify and eliminate barriers to its wider implementation (Stewart-Brown, 2001).

For adolescents, both quantitative and qualitative methods were used to assess their use and appreciation of the E-MOVO score and their search for more information 1 week after the E-MOVO score was provided. Only respondents who filled in their email addresses were approached to participate in the evaluation. Furthermore, server data are used to track the number of respondents who read the E-MOVO score, clicked on related websites and completed the questionnaires for fruit and smoking behavior. In addition, focus group interviews with representatives of the different grades and different school types are held to obtain in depth information about their opinion of the monitoring questionnaire and the related tailored feedback and to clarify results of the quantitative findings (Steckler *et al.*, 1992).

The evaluation for schools, municipalities and RHAs was based on Rogers' diffusion of innovation theory (Rogers, 2003), additional factors that influence diffusion identified by Zaltman and Duncan (Zaltman and Duncan, 1977) and a review of determinants of innovations in healthcare organizations (Fleuren *et al.*, 2004). Rogers (Rogers, 2003) states that an innovation will be more easily adopted depending on its relative advantage, compatibility, complexity, trialability and observability. Also the impact on social relationships, reversibility, communication, time, risk and uncertainty, commitment and changeability were included (Zaltman and Duncan, 1977). On the basis of Fleuren *et al.* (Fleuren *et al.*, 2004), we added characteristics of the organization, the user and the social or political context. For the E-MOVO project, this means, for example, that electronic monitoring should have more advantages than the traditional paper and pencil questionnaires, it should be compatible with the present school situation and the electronic data gathering should be easy to organize. Opinions on the electronic data collection (only for schools), the school or municipal reports and the collaboration with the RHAs are assessed. A year or one and a half years after the monitoring questionnaire was completed, schools and municipalities, respectively, received written questionnaires. The project was also evaluated at the level of the RHAs in order to obtain information about the appreciation of the project and to identify aspects that can be improved.

The results of the evaluation are presented at several international conferences (De Nooijer *et al.*, 2004; Veling *et al.*, 2004), in scientific journals (De Nooijer, submitted) and in a report for the funding agency (De Nooijer *et al.*, 2006). The latter was in Dutch and available for interested parties in the Netherlands. The research design was not appropriate to study changes in (determinants of) the health risk behaviors caused by the intervention.

FUTURE PERSPECTIVES

This paper describes a unique combination of monitoring health, well-being and lifestyle

among Dutch adolescents and providing feedback on the individual, school and municipal levels in order to promote a healthy lifestyle and to stimulate the development of health policies at schools and in municipalities. It has been favorably received and will probably be implemented on a wider scale.

The first E-MOVO round in the Fall of 2003 has shown that such a tool is an appropriate method to monitor health and well-being of the adolescent population, as well as providing them with feedback. More than 35 000 adolescents completed the questionnaire, and 57% read the E-MOVO score. The E-MOVO monitoring instrument and feedback is now also used in other parts of the Netherlands. At present, the results of the evaluation studies are analyzed and recommendations for improvement will be given.

The present project is an example of interaction between research and practice. This is encouraged in the Netherlands. In 2000, the Health Reseach Council (RGO) ([Health Research Council (RGO), 2003]) concluded that workers in public health were insufficiently bringing research into practice. Academic skills and the use of data in developing health policies were insufficient. Therefore, the cooperation between RHAs and universities is promoted through a grant scheme in which joint evidence-based work is stimulated. E-MOVO may serve as an example of such joint work.

The idea of E-MOVO is adopted by the National Institute for Public Health and the Environment (RIVM) which now implements the youth monitor at a national level. The tailored feedback at the individual level will be adapted according to the recommendations based on the evaluation study among adolescents.

ACKNOWLEDGEMENT

This study was supported by a grant from the OGZ fund.

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