

Evaluation of "Live for Life", a health promotion programme in the County of Skaraborg, Sweden

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Abstract

Study objective—To evaluate a health promotion programme, combining a population and individual based strategy, in the County of Skaraborg, Sweden, with special attention to outcome.

Design—The evaluation was subdivided into structure, process and outcome. The evaluation procedure as a total is described here, but the results presented refer only to outcome. In order to study the potential effect of the individually based health examination, 35 year old subjects who had participated five years previously were in 1994–1996 compared with 35 year old subjects who had not participated before, and compared with their own values five years earlier. The results during 1995–1996 were compared with those of 1989–1990 for corresponding ages in order to study the effect of, particularly, the population based strategy.

Setting—The County of Skaraborg in the south western part of Sweden with about 270 000 inhabitants. In addition to population strategy, involving the total county, men and women aged 30 and 35 years were invited to an individually based examination.

Main results—Factors related to body weight increased during the study period, while other factors mostly changed in the direction wanted. As a whole the changes were rather modest. There were favourable changes in lifestyle variables, for example, concerning smoking and dietary habits.

Conclusions—There were beneficial effects from the health promotion programme, but there is a need for continuous improvement of methods of intervention referred to lifestyle.

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During recent years there has been a great interest in cardiovascular prevention programmes in the County of Skaraborg in south western Sweden.^{1–4} A main reason for this interest is the fact that cardiovascular diseases are the most common cause of death before the age of 65 in men and number two among

women in Sweden.⁵ According to a decision by the county government it was decided to start a health promotion programme, combining an individualised and a population based approach. The programme was given the name Live for Life ("Lev Hela Livet" in Swedish). The fundamental idea for the health promotion programme was based on the profound influence of lifestyle on morbidity and mortality shown in earlier studies.^{6,7} The strategy was influenced by health promotion programmes in Great Britain and Sweden, mainly from Norsjö⁸ in northern Sweden with a combination of individual and community based intervention, where the primary health care had a leading role. The programme for food shops was inspired from the Heart Beat Wales programme.⁹ The primary health care was given the responsibility for the Live for Life programme. The individually based intervention programme was the main part.

There has been some criticism, for example, from Labonte,¹⁰ of health promotion programmes focusing on lifestyle, meaning that the individual is responsible for their ill health. The critics have the opinion that it is better to concentrate on socioeconomic and environmental factors in health promotion.

The Live for Life health promotion programme was designed cooperatively by hospital and primary health care physicians and was approved by the political authorities of the county. This intervention programme has now been ongoing in Skaraborg for 10 years. The purpose of this paper is to describe the evaluation programme and report selected results of the evaluation during the first eight years.

Methods

STUDY POPULATION

The non-targeted part of this intervention programme was designed to reach all inhabitants in the County of Skaraborg, which had a population of 272 215 on the 1 January 1989. Individual health examinations have been confined to men and women aged 30 and 35 years. The participation during the first eight years is shown in table 1. Up to the end of 1996, altogether 17 988 persons have been examined. The overall participation rate during the first five years was 64.9% and during

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Table 1 Number of participants in the project Live for Life in the County of Skaraborg during the first eight years (participation rate within parentheses,¹¹ data on participation rate missing for the first year)

Sex and age (y)	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	Total
Men, 30	423	530 (57.6%)	409 (50.6%)	294 (52.3%)	124 (39.7%)	156 (44.0%)	177 (48.9%)	121 (46.6%)	2 234
Women, 30	449	573 (70.8%)	462 (66.3%)	343 (63.4%)	166 (55.1%)	188 (53.4%)	210 (66.8%)	145 (57.9%)	2 536
Men, 35	787	1025 (70.0%)	957 (58.1%)	824 (65.6%)	739 (53.1%)	532 (45.1%)	729 (56.0%)	600 (51.4%)	6 193
Women, 35	850	1099 (82.4%)	1050 (72.0%)	1032 (74.9%)	855 (61.9%)	662 (61.1%)	816 (64.9%)	661 (66.7%)	7 075
Total	2509	3227 (72.4%)	2878 (63.4%)	2493 (66.7%)	1884 (55.1%)	1538 (51.5%)	1545 (59.7%)	1527 (57.5%)	17 988

the three following years 56.6%.¹¹ During 1994–1996, 4997 subjects were examined. Of these, 502 men and 579 women aged 35 had been examined also in 1989–1991, thus five years earlier, at the age of 30 years.

METHODS FOR CARRYING OUT THE HEALTH PROMOTION PROGRAMME

Project plan

A decision was taken in 1988 by the county council of Skaraborg to improve the prerequisites for good health for all residents in the county and to invite 30 and 35 year old residents to a health examination. The main responsibility for the intervention programme was given to the primary health care organisation. A steering committee was elected comprising one official, one head physician from the hospital organisation and three head physicians from the primary health care organisation. The main responsibility for practical details was given to the staff at the health centre of Habo with previous experience from health examinations,^{3, 4} while the project as a whole was supervised by the county council.

Combined population and individual based strategy

The intervention in the programme Live for Life is based on both population and individual based strategies. Nurses and general practitioners working at each of all the health centres across the county were specially educated in prevention and have continued to meet regularly to update their knowledge of preventive measures and to exchange experiences. The prevention programme is a complement to the everyday primary health care, including case finding practised by physicians and nurses when they meet their patients.

Population based intervention programme

Special information and education are given to food shops. A diploma, with the logotype of the programme Live for Life is, as an aid in the marketing, was offered to food shops in the county when they fulfil certain criteria. These are, for example, education of personnel (three lessons to increase the knowledge about low fat and high fibre food), having a good supply of healthy food, displaying healthy food for the customers, and having a price policy that promotes the selling of healthy food. The diploma is awarded for one year but can be renewed, if the criteria are still fulfilled. The model for this part of the intervention programme was taken from the Heart Beat Wales programme.⁹

A special health periodical called Lev Hela Livet (Live for Life) has been sent to the participants in the health examination, and to all personnel working in health service in the county of Skaraborg. It has also been available to all inhabitants of the county, for instance in the waiting rooms of the primary health care centres and hospitals. Health education was also initially given in a series of programmes on the county radio of Skaraborg, and the local newspapers gave health information.

Individually based intervention programme

Specially trained nurses carry out the health examination at the health centres. The examination starts with a general health questionnaire, which the participants completed beforehand at home. Another questionnaire about food intake and a questionnaire about physical activity (only distributed to intermediately physically active persons in order to characterise their activities more in detail) are completed during the health examination. Body height, body weight, waist and hip circumferences and blood pressure are measured, and blood is sampled for immediate analysis of serum cholesterol concentration, and in women also for analysis of blood haemoglobin concentration.

The results of the health examination are summarised in a specially designed health profile. The health profile includes 13 generally accepted risk factors for coronary heart disease graded from 1–3 or 1–4 according to estimated risk.¹¹ Five factors can be defined as exposition variables (use of tobacco and alcohol, dietary habits and physical activity and psychosocial strain), while five factors can be regarded as effect variables (mental stress, body mass index, waist to hip circumference ratio, serum cholesterol concentration and arterial blood pressure, the latter four being biological markers of cardiovascular risk). Additionally there are two genetic factors (family history of diabetes and of cardiovascular disease), and the 13th one deals with the participant's own history of myocardial infarction, cancer, arterial hypertension, diabetes and angina pectoris. The intention with the health profile is to evoke an interest for lifestyle among the participants in the dialogue with the nurse, and to use it as a base for intervention measures. Further details about the health examination have been given in a previous paper.¹¹ After the first five years the health profile has been improved in certain aspects: different grading for diastolic blood pressure, new grading for alcohol consumption and for waist-hip ratio in women. The profile has been completed with some questions with the intention to engage the participant more in the process of changing lifestyle habits, according to the patient centred method.^{12–14}

Programme for intervention

The nurse completes the health profile, and a copy is given to the participant. Every participant has an individual talk with the nurse about risk factors and their interrelations. This dialogue also includes a discussion about how to best decrease the risk, one additional goal being to improve lifestyle without impairing wellbeing. The health profile is a starting point and serves as an educational tool during this dialogue.

When considered appropriate by the participant, the nurse who is responsible for the health examination arranges additional intervention measures. In a special manual there are recommendations when to invite the participants to a new visit to the nurse. The additional intervention programme is mainly carried out on an individual basis but sometimes in groups.

Table 2 Components included in the evaluation programme

<i>Evaluation of structure</i>	
Administrative organisation	
Data management equipment and computerising of data	
Staff educational material	
Methods used at the health examinations for	
Measurement of blood cholesterol concentration	
Measurement of waist to hip circumference ratio	
Measurement for estimation of dietary intake	
Measurement of physical activity	
Measurement of mental stress	
<i>Evaluation of process</i>	
Participation	
Education of population by means of a health periodical	
Certification of food shops	
Education of food shop personnel	
View of nurses and participants in the health examination	
Costs	
<i>Evaluation of outcome</i>	
Effect on lifestyle factors in the population	
Effect on biological markers of lifestyle in the population	
Follow up of high risk individuals	
Follow up of participants in a selected community	

These are arranged by the primary health care organisation alone or in cooperation with local physical activity and educational organisations. This part of the intervention programme varies between the different communities of the county, depending upon local resources, demands and previous experience with preventive work. When considered necessary, the subject is referred to a general practitioner at the local health centre. Further details about the Live for Life programme, methods and instruments used, including the health curve, have been given previously.¹¹

DATA PROCESSING AND STATISTICAL METHODS

Only the data registered on the health profiles are computerised. The health profiles are sent for continuous central computerising, which is conducted by a specially trained nurse. The statistical analysis programmes of Epi Info version 6.04, Winstat and SAS are used. A χ^2 test (2×3) was used for comparison of numbers in the different risk groups for lifestyle. Paired and unpaired *t* tests were used for comparison of biological risk markers, and Wilcoxon's test for comparison concerning lifestyle variables.

METHODS FOR EVALUATION OF THE HEALTH PROMOTION PROGRAMME

The outlines of the initial plan for the evaluation of the health promotion programme are given in table 2. The evaluation was made according to guidelines by Donabedian.¹⁵ This

Table 3 Comparison of biological risk markers in subjects examined both at the age of 30 and at the age of 35 years

Variable studied	Men (n=502)				Women (n=579)			
	30 years		35 years		30 years		35 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Body weight (kg)	80.0	11.2	83.0***	12.2	64.5	10.4	67.2***	11.4
Body height (cm)	180.0	6.4	180.0	7.2	165.9	5.9	165.8	5.9
BMI (kg/m ²)	24.7	3.1	25.6***	3.3	23.4	3.4	24.4***	3.8
Waist (cm)	88.8	9.0	92.1***	9.3	76.2	8.5	78.8***	9.2
Hip (cm)	101.6	6.0	102.9***	6.3	99.7	7.7	101.4***	8.1
WHR (cm/cm)	0.87	0.06	0.89***	0.06	0.76	0.05	0.78***	0.06
Cholesterol (mmol/l)	4.91	0.99	5.16***	1.02	4.82	0.91	5.00***	0.91
Systolic BP (mm Hg)	126.5	11.9	124.8**	11.0	118.2	11.0	118.2	11.0
Diastolic BP (mm Hg)	79.2	9.2	79.5	8.5	76.1	8.5	76.4	8.2

p<0.01, *p<0.001, comparison with values at 30 years of age.

KEY POINTS

- It has been possible to integrate a health promotion programme in the ordinary activities in primary health care centres for several years.
- Lifestyle factors, especially smoking and dietary habits, have changed in a positive way.
- Improved dietary habits, both on the individual and population level, have not been sufficient to counteract increase in body weight.
- There is further need for improvement of methods for health promotion, on the individual and the community as well as on the political level.

means that structure, process and outcome are studied separately. The presentation of results in this paper has been confined to outcome measures.

EVALUATION OF OUTCOME

Evaluation of possible effects of the intervention programme on risk factors was conducted in different ways, three of which will be described in this paper. Lifestyle factors as well as biological markers of cardiovascular risk were compared.

Comparison between the health status at the ages of 30 and 35 years in subjects who participated twice

A comparison was made between the results at 30 and 35 years in subjects who returned for a new examination five years after the first one. The comparison was based on the results recorded on the health profiles.

Comparison between subjects 35 years of age, who had been invited and participated at the age of 30 years, and those who had not

A comparison was made during 1994–1996 between 35 year old men and women who had participated in the health examination five years earlier at the age of 30 years and men and women from communities where the inhabitants had not been invited to participate at the age of 30 years. The comparison was based on the results of the health profiles.

Table 4 Mean values and standard deviations (SD) in 1994–1996 for selected variables included in the health curve in the programme Live for Life of 35 year old participants examined twice (also at the age of 30 years) and examined only once

Variable studied	Men				Women			
	Examined once (n=1359)		Examined twice (n=502)		Examined once (n=1560)		Examined twice (n=579)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Body weight (kg)	83.1	12.6	83.0	12.2	67.8	11.9	67.2	11.4
Body height (cm)	179.9	6.6	180.0	7.2	166.2	6.3	165.8	5.9
BMI (kg/m ²)	25.7	3.5	25.6	3.3	24.6	4.1	24.4	3.8
Waist (cm)	92.1	10.0	92.1	9.3	79.5	10.2	78.8	9.2
Hip (cm)	103.5	6.8	102.9*	6.3	102.3	8.4	101.4*	8.1
WHR (cm/cm)	0.89	0.06	0.89	0.06	0.76	0.06	0.78	0.06
Cholesterol (mmol/l)	5.39	1.14	5.16***	1.02	5.14	0.99	5.00**	0.91
Systolic BP (mm Hg)	125.7	11.5	124.8	11.0	118.7	11.6	118.2	11.0
Diastolic BP (mm Hg)	79.9	9.0	79.5	8.5	76.3	8.7	76.4	8.2

*p<0.05, **p<0.01, ***p<0.001, comparison with those examined once and those examined twice.

Comparison between the beginning and the end of the study period

A comparison was made between the results during the years 1989–1990 and 1995–1996 with the main purpose of determining in what way the population based strategy may have influenced the inhabitants of the study areas.

Results

POTENTIAL EFFECT OF THE INDIVIDUAL BASED STRATEGY

Comparison between the same subjects at 30 and 35 years

Smoking decreased significantly during the follow up period both in men (p<0.001) and women (p<0.05). Dietary intake improved in both genders (p<0.001). Psychological strain decreased (p<0.001 both for men and women). As far as biological risk markers are concerned (table 3), systolic blood pressure decreased in men, while body weight, waist-hip ratio and serum cholesterol concentration increased in both genders during the follow up period.

Comparison during 1994–1996 between 35 year old previous participants and 35 year olds who had not previously been invited to participate

Concerning lifestyle variables significant differences were observed for smoking in men (p<0.01), with a higher number of non-smokers among those examined twice, and for psychosocial strain (p<0.01) and mental stress (p<0.001) in women, a lower number reporting psychosocial strain and mental stress in those examined twice. The dietary intake was also more favourable in women examined twice (p<0.05). Concerning biological risk markers (table 4), statistically significant differences were observed for serum cholesterol concentration and hip circumference in both men and women with lower values for those who were examined for the second time.

POTENTIAL EFFECT OF THE POPULATION BASED STRATEGY

Comparison between the periods 1989–1990 and 1995–1996

According to the statements of the participants, smoking decreased in a statistically

Table 5 Mean values and standard deviations (SD) during the 1989–1990 and during 1995–1996, respectively, for selected variables included in the health profile

Variable studied	Examined in 1989–1990				Examined in 1995–1996			
	Aged 30		Aged 35		Aged 30		Aged 35	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Men								
	(n=953)		(n=1812)		(n=298)		(n=967)	
Body weight (kg)	80.5	11.4	80.0	10.9	81.1	11.5	83.5***	12.7
Body height (cm)	180.2	6.4	179.5	6.6	180.0	6.4	180.0	6.7
BMI (kg/m ²)	24.8	3.2	24.8	3.0	25.0	3.2	25.7***	3.4
Waist (cm)	89.1	9.1	89.7	8.6	89.3	9.2	92.4***	9.9
Hip (cm)	101.6	6.0	102.1	5.7	102.7*	6.1	103.6***	6.6
WHR (cm/cm)	0.88	0.06	0.88	0.06	0.87	0.05	0.89***	0.06
Cholesterol (mmol/l)	4.96	1.02	5.33	1.19	4.94	0.93	5.41	1.16
Systolic BP (mm Hg)	126.9	11.9	125.9	11.6	125.0*	10.1	125.1	11.5
Diastolic BP (mm Hg)	79.2	9.3	79.7	9.0	77.7*	7.4	79.4	9.1
Women								
	(n=1022)		(n=1949)		(n=355)		(n=1053)	
Body weight (kg)	64.6	10.5	64.8	10.8	66.9***	12.7	68.1***	11.9
Body height (cm)	166.3	6.0	165.8	6.0	166.1	5.9	166.2	6.3
BMI (kg/m ²)	23.3	3.5	23.6	3.7	24.3***	4.4	24.7***	4.1
Waist (cm)	76.2	8.7	76.4	9.1	77.7**	10.4	79.6***	10.2
Hip (cm)	99.6	7.4	100.6	7.8	101.1**	8.7	102.6***	8.5
WHR (cm/cm)	0.76	0.06	0.76	0.06	0.77	0.05	0.77***	0.06
Cholesterol (mmol/l)	4.88	0.94	5.02	0.97	4.85	0.98	5.11*	1.02
Systolic BP (mm Hg)	117.8	11.2	119.4	11.6	116.2*	11.3	118.7	11.2
Diastolic BP (mm Hg)	75.4	9.1	77.0	8.4	73.9**	7.7	76.2*	8.4

*p<0.05, **p<0.01, ***p<0.001, comparison between the observations in 1989–1990 and 1995–1996.

significant way in both 30 and 35 year old men ($p < 0.001$) and 35 year old women ($p < 0.001$). Dietary intake improved in all age and gender groups ($p < 0.001$ in both male age groups, $p < 0.01$ for women 30 years of age and $p < 0.05$ in 35 year old women). The number of physically inactive subjects decreased in a statistically significant way in 30 year old men ($p < 0.01$) and in both female groups ($p < 0.001$). Psychosocial strain was reported to have increased in both ages and both sex groups ($p < 0.001$). Mental stress increased in 35 year old women ($p < 0.001$).

When comparing biological risk markers of cardiovascular disease (table 5) in participants during 1989–1990 with those during 1995–1996, several differences of statistical significance were observed. Systolic and diastolic blood pressures were lower during the later period in 30 year old men and women, and diastolic blood pressure was lower in 35 year old women. There was a notable increase of body weight, and of waist and hip circumferences, in both female groups and in 35 year old men. In 30 year old men there was an increase of statistical significance in hip circumference, but not in body weight or waist circumference.

Discussion

The main intention with the evaluation was to find out if our methods for intervention with respect to lifestyle and biological risk markers had been efficient. As a method for evaluation of the individualised approach 35 year old subjects, who had been examined both at 30 and 35 years, were compared with 35 year old subjects who were examined for the first time. The potential effect of the population based programme was studied by comparing subjects examined during the first phase of the study period with subjects of the same age who were examined during the later phase of the period.

The main results, both observed when studying the individualised and the population based approach, were: increased body weight and waist-hip ratio, less smoking, improved dietary habits and decreased blood pressure.

Body weight and waist-hip ratio increased both with time and age despite improved reported dietary habits and a smaller number of subjects being physically inactive with time. This trend is the same in the County of Skaraborg and in the whole industrialised world.^{16–18} Perhaps this can be explained by a general decrease in small and very small but frequently repeated physical activities in the industrialised countries.¹⁹

The trend towards less smoking in the County of Skaraborg during the study period is in agreement with what has happened in Sweden as a whole.²⁰

Despite the increase in body weight there was a trend towards lower blood pressure with time. It is difficult to find a reasonable explanation for this, but this finding is in agreement with some previous observations.^{18 21}

The negative time trend towards higher mental stress and psychosocial strain is probably attributable to increased mental strain at work and rapidly increasing unemployment

during the 1990s. Those examined twice instead reported less psychological strain than those examined for the first time. Those examined twice also had more favourable lifestyle than those examined once.

The participation rate was high during the first years. There are several reasons for this. The examinations were free of charge during the first five years but not later on. Increasing economic difficulties, both for the individuals and for the primary health care organisation, is probably one explanation for a lower participation later on. Some primary health care centres in the county have for financial reasons left the programme or stopped to invite those aged 30 years. Decreasing interest in primary prevention in the society and in the primary health care organisation may be another reason. This latter reason was reported also from the community of Norsjö in the north of Sweden.⁸

It is more difficult to evaluate a programme being integrated in the ordinary work continuing without a time limit, such as the Live for Life programme, than a specific scientific project, which has been given separate resources. Furthermore, in addition to the intervention efforts from the programme, the people in the community are influenced from several other sources, for example, media and time trends.

There have been some rather pessimistic conclusions from large population based intervention programmes. The Minnesota Heart Health Programme²² and the North Karelia project²³ could not show a decrease in mortality in the intervention area in comparison with the control area. The spreading effect to the control areas and the general decrease in cardiac heart disease can be some explanations for this. The intervention programmes in primary health care are usually not designed to study mortality, but changes in cardiovascular risk factors. In Britain the British Family Heart Study could show a 16% decrease in coronary risk score.²⁴ There was also a reduction in coronary risk factors in the OXCHECK study.²⁵

There are encouraging results from other intervention projects in Swedish primary health care organisations, such as those in Strömstad,²⁶ Sollentuna,²⁷ and Norsjö.⁸ This last mentioned project is like the one in Skaraborg, a combination of individual health examinations and population based intervention measures concentrating on dietary habits. The Norsjö project has had more resources and has been more expensive than the Live for Life programme. Before the start of the project the incidence of myocardial infarction in Norsjö was among the highest in Sweden. The project could show a decrease of cardiovascular risk index by 36% in the intervention area compared with a decrease of 1% in the control area.⁸ There was a combined positive effect of individual and population intervention measures, where the individual intervention effect was more pronounced.

The role and the workload of the health care organisation have been small in the American intervention projects compared to these primary health care projects. There were some

recommendations from the Swedish Cochrane collaborations evaluation of population based intervention programmes.²⁸ The primary health care organisation was considered appropriate for organising health care work according to the need of the people in the area, especially as most people have continuous contact with primary health care.

After several years of work with health promotion in primary health care and on community level we have the opinion that this kind of work has to be done on several levels: national and supranational, for example, European Union by means of laws, taxes, price and traffic policy. It is urgent to improve health education in school and media. It is important that doctors and nurses take interest in lifestyle of the patients in the ordinary contacts in hospitals and primary health care. We consider cooperation between a large number of actors including politicians, teachers, journalists, food providers, medical associations, doctors and nurses in ordinary health care as fundamental in the process.

In summary, we find the way of evaluation by separately studying structure, process and outcome as a suitable method for evaluation. The evaluation mainly showed beneficial effects from the Live for Life programme, but they were moderate. However, it seems from previous studies that even small improvement of lifestyle factors can improve the long term prognosis with respect to mortality and cardiac heart disease considerably.^{6,7} Nevertheless, a main conclusion from our evaluation is that there is a need for continuous improvement of intervention methods referring to lifestyle and cardiovascular risk factors. We continuously try to improve our methods in the Live for Life programme, and we also find it important to continue the evaluation of the effects of our methods.

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