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# Evaluation of a physical activity promotion program in primary care

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**Background.** Physical inactivity increases the risk of many chronic disorders. It is not clear which strategies are the most appropriate to enable people to adopt a more active lifestyle. Randomized controlled trials have found that brief advice from GPs supported by written material had a significant positive effect on patient's physical activity. The pilot project 'Move for Health and the Environment' translated this evidence into a program suitable for the real-life situation of busy practices. The aim of this study was to evaluate the change in physical activity level of the participating patients 1 year after the intervention.

**Methods.** Patients aged 16–65 years completed a screening questionnaire before consultation with their physician. Insufficiently active patients were offered an information leaflet and a voucher for a physical activity counselling session. One year later, all inactive patients and a random selection of the active were re-contacted and invited to answer identical questions.

**Results.** A total of 1239 (73.9%) returned the follow-up questionnaire. In all, 37.3% of the formerly inactive patients met the threshold of sufficient activity at follow-up, whereas 20.3% of the previously active no longer did. Formerly inactive patients reported an increase of 58.8 minutes/week of moderate and 34.6 minutes/week of vigorous activity and spending more time walking and cycling. Formerly active patients reported less time spent in moderate activities.

**Conclusions.** Systematic counselling in primary care encouraged insufficiently active patients to adopt a more active lifestyle. Yet it became evident that active patients also need counselling to maintain their activity levels.

**Keywords.** Family medicine, health promotion, outcome assessment.

## Introduction

Physical inactivity is an important public health problem in many modern societies. In Switzerland, 64% of the adult population does not achieve the recommended levels of physical activity requiring a minimum of 30 minutes of moderate-intensity physical activity 5 days/week or 20 minutes of vigorous-intensity physical activity 3 days/week.[1] Reduced physical activity is associated with increased cardiovascular diseases, non-insulin-dependent diabetes mellitus, hypertension and being overweight.[2]

Of the adult Swiss population, 61% reports at least one family physician contact each year.[3] Primary care is thus in an ideal position to address a large population at risk of sedentary lifestyle. Recent systematic reviews of trials assessing the efficacy of advice given in routine primary care consultation found that brief advice from GPs supported by written material had a modest but significant short-term effect on physical activity lasting 6–12 months.[4,5]

A randomized controlled trial including five medical practices in Zürich and a feasibility study including two GPs[6,7] have successfully tested the effect of physical activity counselling in a primary care setting in Switzerland. In contrast to these randomized controlled trials including a small number of highly motivated physicians and patients, the present project 'Move for Health and the Environment' aimed at translating this evidence into a program suitable for the real-world situation of busy practices. The project has been initiated by a group of primary care physicians in urban and rural areas of the Northwestern part of Switzerland and successfully motivated 40 of 250 primary care physicians to participate.[8] Patients visiting a practice completed, before consultation, a one-page questionnaire

assessing physical activity level, which was then discussed during consultation. Insufficiently active patients were further counselled.[8]

Twelve months after the visit to the practice, a follow-up questionnaire with identical questions regarding physical activity was sent to the participating patients to evaluate the effectiveness of the intervention. The aim of the present analyses was to evaluate the change in physical activity level of the participating patients from consultation time to 1 year later.

## Methods

*Project organization and recruitment*

During eight predefined 2-week campaigns (April 2004 to June 2005), patients' physical activity levels were assessed by means of a patient-completed screening questionnaire distributed before consultation to all patients who visited their physician routinely and were aged 16–65 years with sufficient knowledge of German. The physicians evaluated the physical activity level of each patient and discussed it during the consultation. During the first week of each screening campaign, all insufficiently active patients without a medical reason for physical inactivity were offered a leaflet with ideas and tips how to increase physical activity. The leaflet was based on the brochure of Action D, a diabetes prevention program.[9] During the second week of each campaign, inactive patients were additionally offered a voucher for two 30-minute counselling sessions with a specially trained physiotherapist or physician. Active commuting such as cycling and walking was encouraged as a feasible method to integrate regular physical activity into a sedentary lifestyle, providing benefits both for health[10,11] and the environment.

All insufficiently active patients and a random sample of active patients who had completed the screening questionnaire and consented to be re-contacted were surveyed again after 12 months. The project was approved by the local ethics committee. Patients received written information about the project and gave written consent if they wished to participate.

*Questionnaire*

As previously described,[8] patients' baseline physical activity levels were assessed with a questionnaire based on questions from the Swiss Health Survey 2002 and the Health Enhancing Physical Activity (HEPA) Survey 1999/2001.[1,12] To measure moderate physical activity levels, patients were asked on how many days per week and for how many minutes per day they performed activities such as brisk walking, hiking, dancing or gardening. Vigorous-intensity physical activity levels were determined by asking participants on how many days per week and for how many minutes per day they performed activities such as aerobics, tennis, team sports, swimming, weight training and heavy gardening like shovelling or digging. Combining answers to these two questions, patients who performed at least 90 minutes of vigorous exercise per week or who spent at least 150 minutes with moderate physical activity per week were classified as sufficiently active. It was also asked in the screening questionnaire whether patients intended to change their physical activity behaviour during the next 6 months or during the next 4 weeks. According to the Stages of Change Theory,[13] patients who did not intend to change physical activity behaviour during the next 6 months were considered to be pre-contemplators, patients who intended to change during the next 6 months but not during the next 4 weeks were classified as contemplators and those who intended to change their physical activity behaviour during the next 4 weeks were considered to be in preparation.

In addition, patients indicated their age, sex, weight and height in the screening questionnaire and their body mass index (BMI) (weight/height$^2$) was calculated.

Patients were also asked about their daily mode of transportation; time spent walking, cycling and using public transportation and distance travelled by car on weekdays and weekends.

The follow-up questionnaire sent to the patients 1 year after completion of the screening questionnaire contained identical questions.

*Data analysis*

All analyses were conducted with Stata version 8.1 (StataCorp LP, College Station, TX). The Mann–Whitney *U* test was used for comparison of means, the chi-square test for the comparison of proportions. To evaluate the factors associated with the formerly inactive patients becoming active, multivariate logistic regression analyses were performed. The models included age, sex, BMI, stage of change and intervention method as potential explanatory variables. To evaluate the change in minutes of moderate and vigorous physical activity or in time spent in different modes of transportation between baseline and follow-up, the differences were computed for each patient and averaged according to activity level at baseline. A $P$ value $<0.05$ was considered to be significant.

## Results

In all, 4983 patients completed a questionnaire at baseline, and 1216 were considered to be inactive according to the project cut-off for sufficient activity (90 minutes vigorous activity or 150 minutes moderate activity per week). Of these inactive patients, 1075 (88.4%) were invited to take part in the follow-up; 141 (11.6%) patients had either not consented to be re-contacted or had an invalid address. In addition, a random selection of 601 patients of 3767 active at

baseline were contacted too. A total of 1239 (73.9%) patients, 463 (77.1%) formerly active and 776 (72.2%) formerly inactive, returned the follow-up questionnaire. Participants of the follow-up study were more likely to be active at baseline and of older age ($P < 0.05$) but they did not differ from non-participants in any other baseline characteristic including the stage of change.

*Characteristics of study population according to the activity level at baseline*

The characteristics of the study population according to activity level at baseline are given in Table 1. The mean age was 44.3 ± 13.2 years, 45.3% of the participants were males and 47.6% had a BMI >25 kg/m$^2$. Compared to formerly active, the formerly inactive patients were more likely to be of older age ($P = 0.077$), to be overweight ($P = 0.001$) and to be precontemplators or contemplators ($P < 0.001$).

At baseline, 63.1% ($n = 347$) of the follow-up population had received a brochure, 3.3% ($n = 18$) a voucher only, 17.6% ($n = 97$) a brochure plus a voucher and 16% ($n = 88$) did not want to receive either a brochure or a voucher.

Figure 1 displays the change of activity levels from baseline to follow-up of formerly active and inactive patients. Of the formerly inactive participants, 37.2% reported increased physical activity and became sufficiently active while 20.3% of the formerly active patients reported decreased physical activity and became insufficiently active. The change in physical activity level could not be evaluated for 11.5% of the follow-up population because of incomplete responses to the follow-up questions.

Factors associated with becoming active (age, BMI, sex and stage of change and mode of intervention) were evaluated using multivariate analyses. With the exception of mode of intervention, none of these variables showed a significant effect. As illustrated in Figure 2, those formerly inactive patients who felt that they did not need a brochure or a voucher were the only subgroup who were significantly more likely to meet the cut-off for sufficient activity at follow-up [adjusted odds ratio = 1.9 and 95% confidence interval (CI): 1.1–3.2]. This subgroup of patients was also more likely to indicate, in the baseline questionnaire, that they intended to change their physical activity behaviour during the next 4 weeks. Of them, 66.7% were in the stage of preparation, compared to 47.5% of the whole follow-up population. There was not a significant difference between these two groups concerning age, sex and BMI.

Table 2 shows the mean change in reported minutes per week of moderate and vigorous physical activity from baseline to follow-up according to baseline activity levels. Formerly inactive patients reported significantly more minutes of moderate and vigorous activity, whereas formerly active patients indicated significantly less minutes of moderate physical activity and no significant change in vigorous activity.

*Change of time or distance spent in different modes of daily transportation*

Table 3 illustrates the mean time or distance spent in different modes of daily transportation on weekdays at baseline and at follow-up according to activity levels at baseline. Although the group of active patients at baseline accumulated significantly more minutes of human-powered mobility (biking and walking) both at baseline and at follow-up, their mobility behaviour did not change significantly over time. The formerly inactive, however, reported significantly more walking (13.0 minutes, 95% CI: 3.7–22.2) and biking (9.8 minutes, 95% CI: 5.3–14.3) at follow-up and a modest but significant reduction of distance covered by a car. These changes occurred over the whole group of formerly inactive and do not necessarily represent a shift from motorized to human-powered mobility on an individual level. There was no significant difference between the initially inactive and active concerning the use of public transportation or cars at baseline. On weekends, time and distance spent in different modes of transportation did not change much. Only the reported biking time of formerly inactive increased significantly (mean: 15 minutes, 95% CI: 6.7–23).

## Discussion

The present 1-year follow-up of a cohort of primary care patients who participated in the physical activity counselling project 'Move for Health and the Environment' shows a small but significant increase in moderate and intense self-reported physical activity among previously inactive patients. Of the formerly inactive patients, 37.2% met the threshold of sufficient physical activity at follow-up. The increase in reported physical activity was paralleled by an increase in time spent in active mode of transportation. Yet, 20.3% of the formerly active did no longer reach the threshold of sufficient physical activity, mainly due to a decrease of time spent in everyday moderate physical activities. Providing a voucher for a special counselling session was not associated with an increase in physical activity.

Part of the shift in activity level described above may be due to spontaneous changes in daily physical activity over time. Recent data from a Swiss longitudinal panel study interviewing a cohort of ~3000 people each year indicated spontaneous changes from one wave to the other in becoming active or becoming inactive to be in a range of 11–14%.[14] The changes observed in the present study clearly exceed spontaneous change rates and might thus be interpreted as small but positive effects on physical activity behaviour similar to those

TABLE 1 *Characteristics of the follow-up study population stratified by activity level at baseline*

| Characteristics | Total ($n$ = 1239), $n$ (%) | Activity level at baseline | | $P$ value[a] |
|---|---|---|---|---|
| | | Active ($n$ = 463), $n$ (%) | Inactive ($n$ = 776), $n$ (%) | |
| Age (years), mean ± SD | 44.3 ± 13.2 | 43.2 ± 14.0 | 45.0 ± 12.7 | 0.077 |
| Sex | | | | |
| Male | 561 (45.3) | 224 (48.4) | 337 (43.4) | 0.090 |
| Female | 678 (54.7) | 239 (51.6) | 439 (56.6) | |
| BMI | | | | |
| <25 | 644 (52.4) | 261 (57.6) | 383 (49.4) | 0.001 |
| ⩾25 to <30 | 399 (32.5) | 144 (31.8) | 255 (32.9) | |
| ⩾30 | 186 (15.1) | 48 (10.6) | 138 (17.8) | |
| Stage of change | | | | |
| Pre-contemplation | 215 (27.4) | 65 (21.7) | 150 (30.9) | <0.001 |
| Contemplation | 197 (25.1) | 59 (19.7) | 138 (28.5) | |
| Preparation | 373 (47.5) | 176 (58.7) | 197 (40.6) | |

[a]Mann–Whitney $U$ test used for age comparison and chi-square test used for comparison of other characteristics.

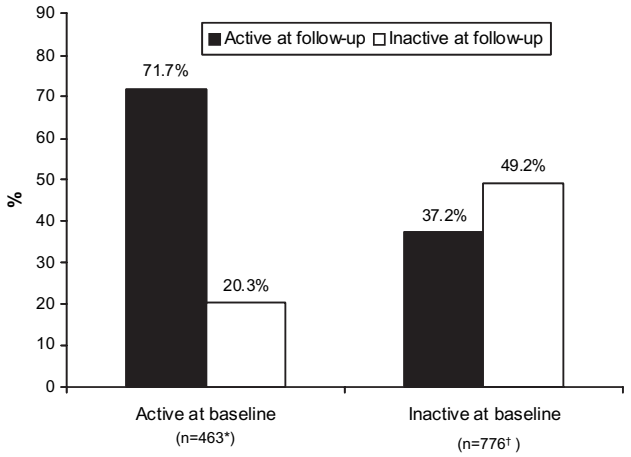


FIGURE 1 *Comparison of activity levels at follow-up according to baseline levels (asterisk indicates baseline active: 7.8% missing at follow-up; dagger indicates baseline inactive: 13.5% missing at follow-up*

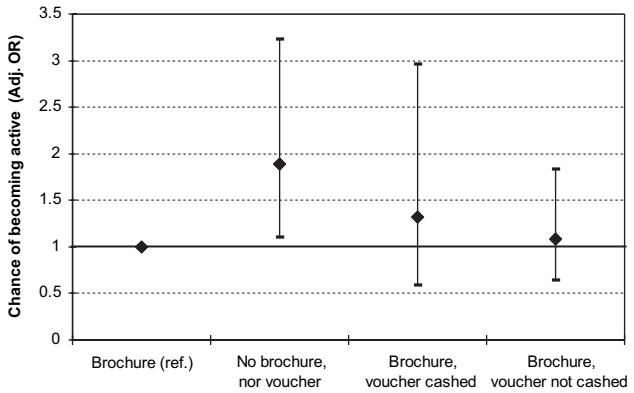


FIGURE 2 *Association between change in activity and type of intervention (odds ratio adjusted for age, sex, BMI and stage of change)*

documented by randomized controlled trials[4,5,15] for counselling interventions in primary care.

The strength of the present evaluation is its ability to successfully re-contact 72% of all inactive patients and to include in addition a random sample of formerly active patients. It also allowed to study the development of physical activity levels in patients considered to be sufficiently active at baseline and to highlight the fact that this group needs to be encouraged to maintain their activity level.[2]

It is further noteworthy that previously inactive patients reported significantly more time spent in active transportation during weekdays confirming that cycling and walking are feasible methods to integrate regular physical activity into a sedentary lifestyle. There is increasing evidence of a direct beneficial health effect associated with active transportation.[10,11,16,17]

Developing and evaluating a counselling project suitable for routine use in primary care inevitably imposes restrictions on logistics. Due to costs and practicability, it was not possible to objectively assess patients' level of physical activity, e.g. by means of accelerometers or pedometers. Thus, the assessment of patients' physical activity had to rely on questionnaire information as it is commonly done in large epidemiological studies. The test–retest reliability of responses to the physical activity questions has previously been tested in Switzerland[18] and was found to be fair to good. In addition, the responses correlated moderately but significantly with accelerometer readings. Although these short questionnaires provide only a crude measure of physical activity, the responses to these questions have repeatedly been associated with cardiovascular disease and all-cause mortality in longitudinal studies.[10,19,20]

Relying on self-reported physical activity can, however, potentially bias the results if patients who had

TABLE 2 *Mean change in minutes per week of moderate and vigorous activity from baseline to follow-up according to baseline activity level*

| Classification at baseline | Moderate activity ($n$ = 1038[a]) | | Vigorous activity ($n$ = 949[b]) | |
|---|---|---|---|---|
| | ΔTime (minutes/week) | 95% CI | ΔTime (minutes/week) | 95% CI |
| Active | –58.7 | –114.3 to –3.2 | 11.7 | –21.1 to 44.5 |
| Inactive | 58.8 | 38.8 to 78.7 | 34.6 | 21.3 to 47.8 |
| Total | 12.8 | –12.6 to 37.7 | 25.4 | 10.1 to 40.7 |

[a]Missing 201 of total 1239.
[b]Missing 290 of total 1239.

TABLE 3 *Change of time or distance spent in different modes of daily transportation baseline, follow-up and change according to baseline activity level*

| Transportation mode | Baseline activity level | | At baseline | | At follow-up | | Difference | |
|---|---|---|---|---|---|---|---|---|
| | | $n$ | Mean | 95% CI | Mean | 95% CI | Mean | 95% CI |
| Walking (minutes/day) | Active | 388 | 110.1 | 96.3 to 123.8 | 100.7 | 87.8 to 113.5 | –9.4 | –23.5 to 4.7 |
| | Inactive | 613 | 63.8 | 56.1 to 71.6 | 76.8 | 67.6 to 86.0 | 13.0 | 3.7 to 22.2 |
| Cycling (minutes/day) | Active | 119 | 37.1 | 28.4 to 45.8 | 43.2 | 24.7 to 61.7 | 6.1 | –9.9 to 22.0 |
| | Inactive | 105 | 15.0 | 12.5 to 17.5 | 24.8 | 20.8 to 28.9 | 9.8 | 5.3 to 14.3 |
| Public transport (minutes/day) | Active | 175 | 52.9 | 44.4 to 61.4 | 52.8 | 41.8 to 63.8 | –0.1 | –12.7 to 12.5 |
| | Inactive | 255 | 62.7 | 46.4 to 79.0 | 65.2 | 52.9 to 77.5 | 2.5 | –15.1 to 20.1 |
| Automobile driver (km/day) | Active | 234 | 47.4 | 39.9 to 54.9 | 43.4 | 35.4 to 51.4 | –4.0 | –13.9 to 5.9 |
| | Inactive | 414 | 53.3 | 46.3 to 60.3 | 50.5 | 44.3 to 56.7 | –2.8 | –10.6 to –5.1 |
| Automobile codriver (km/day) | Active | 60 | 23.3 | 14.6 to 32.0 | 28.4 | 15.2 to 41.5 | 5.1 | –9.5 to 19.6 |
| | Inactive | 91 | 18.2 | 12.2 to 24.2 | 28.7 | 17.8 to 39.7 | 10.6 | –0.8 to 21.9 |

been advised by their physicians at baseline tend to over-report physical activity at follow-up. In the present study, inactive patients received either a brochure or an addition voucher and discussed their physical activity levels with their physician, whereas sufficiently active patients did not receive a voucher or a brochure. It is therefore possible that part of the differences in self-reported physical activity at follow-up may be explained by differential reporting by these two groups of patients. Yet, it is rather unlikely that patients remembered exactly how many minutes of physical activity they had indicated in the screening questionnaire, which they filled in 12 months prior to the follow-up assessment. Indirect evidence of patients' imprecise memory is given by the observation that >50% of patients did not remember having been offered a voucher for a physical activity counselling session when asked at follow-up.

Analogous to a previous study,[21] receiving a voucher for a physical activity counselling session with a specially trained physician or physiotherapist or accepting a brochure with tips on how to increase physical activity was not associated with increased physical activity as reported at follow-up. It was rather the group of inactive patients who felt that they did not need neither a voucher nor a brochure who reported significantly more physical activity at follow-up. According to the screening questionnaire, this subgroup of patients was in a more advanced stage of change and thus, it seems likely that the brief discussion with their physician provided the relevant trigger for them to change their physical activity behaviour.

In summary, the pilot project 'Move for Health', which has been developed by primary care physicians to be suitable for the routine conditions of a busy practice, has successfully motivated 40 primary care physicians to participate and approached a large number of inactive patients, as previously described.[8] The results of the present analyses indicate that GP's brief counselling of inactive patients to adopt a more active lifestyle was moderately effective, although supplementary written information or counselling sessions did not show any additional effect. The lessons learned from this primary prevention project have meanwhile been implemented and the project continues to run.

## Declaration

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Ethical approval: Local ethics committee.
Conflict of interest: None.

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