

Article

Promotion of Physical Activity Using Point-of-Decision Prompts in Berlin Underground Stations

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Abstract: To evaluate point-of-decision prompts in the promotion of stair use in Germany, motivational posters were placed at three underground stations in Berlin. The proportion of passengers using stairs or stairways was counted before, during installation, and two weeks after removal of posters. In total, 5,467 passersby were counted. Stair use increased significantly in women, but not in men. The present pilot study thereby shows that the use of point-of-decision prompts is also feasible in Germany and it provides some evidence of effectiveness. Methodologically rigorous studies are warranted to confirm these findings.

Keywords: prevention; health promotion; physical activity; point-of-decision prompts

1. Introduction

Physical inactivity is a significant risk factor for numerous chronic diseases such as diabetes, hypertension, cardiovascular and cerebrovascular diseases, malignancies, osteoporosis, injuries caused by falls and premature mortality [1–6]. Current guidelines therefore recommend being physically active on a regular basis. The prerequisite for a positive health effect is burning an additional 1,000 kcal per

week through physical activity, or rather engaging in a minimum of 30 minutes of moderate physical activity on five days, or 20 minutes of vigorous physical activity three days per week [7,8]. Despite this knowledge, physical inactivity and sedentary lifestyle are major problems in industrialised nations [9–11].

In addition to the health consequences of physical inactivity and sedentary lifestyle, associated diseases reflect a considerable economic burden for health care systems [12]. Increasing physical activity through leisure-time activities, structured exercise or sports is therefore of importance to prevent the occurrence of many diseases and associated health care expenditures. Our environments, however, make performing exercises in our day to day lives difficult. Often the surroundings are arranged in such a way as to explicitly discourage engaging in physical activity, e.g., use of escalators and lifts instead of the stairs in train stations. Research in some industrialised nations has shown that it is possible to increase the usage of stairs in the aforementioned settings by using simple and fairly inexpensive posters and signs, so-called “point-of-decision prompts” [13]. Although this strategy may not increase physical activity sufficiently for any individual person to meet current recommendations, it could still have important public health implications. For instance, recent studies have shown, that on a population level, relatively small energy gaps from approximately 8 to 100 kcal per day are responsible for weight gains over past years [14–17]. By small increases in energy expenditure through stair use, point-of-decision prompts could therefore contribute to the improvement of energy balance on a population level.

Studies from different industrialized countries have investigated the effectiveness of point-of-decision prompts in different settings [13]. However, no investigations have yet been conducted in Germany. Also, it has been suggested, that intervention effectiveness might not be uniform across different target groups, settings, and types of prompts [13,18–22]. The objective of this pilot study was therefore, to test the feasibility and effectiveness of using posters as point-of-decision prompts in Germany. Specifically, this was done by investigating whether there was an increase in the usage of stairs among men and women in underground stations in Berlin as a result of exposure to point-of-decision prompts.

2. Methods

The investigation was carried out as a pre- and post intervention study design. A poster was developed as a point-of-decision prompt. The format of the posters was A1 (594 × 841 mm) and they contained a message encouraging passersby to use the stairs instead of the escalators. The poster was developed by a team of marketing experts and researchers in the field of health promotion and prevention. The design of the posters is depicted in Figure 1. Three busy Berlin underground stations, that have both an escalator and a flight of stairs directly next to each other, were chosen. One poster was fastened at the bottom of each stairwell to facilitate ascent. Positions next to stairs and escalators were chosen in a way, to make them easily visible for passersby approaching stairs and escalators. The number of passersby that used either the stairs or the escalator for ascent were counted at four points in time.

Figure 1. Poster design (translation of poster title “Take Me! Your Stairs!”).



Men and women were counted separately to investigate whether there were any sex specific differences. To minimize seasonal influences the study was conducted during 10 weeks in the period between August and October 2008. The first count was done before the posters were set up. The second count was done in the first week after the posters were up and the third count was done in the fifth week after the posters were up. The last count was done after 10 weeks, two weeks after the posters had been removed. All counts lasted one hour per underground station and were conducted during the morning rush hour. The counts were conducted on the same weekday, at the same time for each subway station.

The statistical analysis was done separately for men and women. We present the absolute numbers and numbers in percentages for stair and escalator use, for the four counts that were done. Further, the relative risk for the pre- and post-comparison are presented as well as the absolute and relative changes together with 95% confidence intervals. Two-sided tests of equal proportions were used to investigate differences in the proportion of stair users. P-values < 0.05 were considered statistically significant. Statistical analysis was performed using SAS version 9.2 (SAS Institute, Cary, NC, USA).

3. Results

In total 5,467 persons were counted, 3,167 women (58%) and 2,300 men (42%). The total number of men and women counted at different time points is presented in Tables 1 and 2. Before the posters were hung, 18.9% of the women (N = 164) and 29.6% of the men (N = 204) used the stairs. The remaining persons used the escalator. After the posters were up the number of women who used the stairs increased to 31.9% and decreased slightly after that, but stayed higher than before posters were hung, even in the 10th week, two weeks after the posters were removed (Table 1). The difference compared to the baseline count is statistically significant for all further counts. There was no influence on the number of men who used the stairs at any point in time (Table 2). When considering men and women together, the proportion of persons who used the stairs was 23.7% at baseline and increased to 30.4%, 27.2%, and 30.0%, at week 1, week 5 and week 10, respectively.

Table 1. Stair use of women at different points in time.

N=3,167	Without poster Baseline (n = 867)	With poster Week 1 (n = 796)	With poster Week 5 (n = 656)	Without poster Week 10 (n = 848)
Use of stairs	18.9% 164	31.9% 254	28.5% 187	31.5% 267
Absolute change* (95% CI)	-	13.0%** (8.8–17.1)	9.6%** (5.3–13.9)	12.6%** (8.5–16.6)
Relative change* (95% CI)	-	68.7% (46.6–90.6)	50.7% (27.9–73.7)	66.5 (44.8–87.8)
Relative Risk* (95% CI)	-	1.69 (1.42–2.00)	1.51 (1.25–1.81)	1.66 (1.40–1.97)

* compared to baseline count, ** p < 0.0001, CI: confidence interval.

Table 2. Stair use of men at different points in time.

N = 2,300	Without poster Baseline (n = 690)	With poster Week 1 (n = 577)	With poster Week 5 (n = 449)	Without poster Week 10 (n = 584)
Use of stairs	29.6% 204	28.4% 164	25.4% 114	27.7% 162
Absolute change* (95% CI)	-	−1.1%** (−6.1–3.9)	−4.2%** (−9.4–1.2)	−1.8%** (−6.8–3.2)
Relative change * (95% CI)	-	−3.9% (−20.1–13.2)	−14.1% (−31.6–4.0)	−6.2% (−22.9–10.7)
Relative Risk* (95% CI)	-	0.96 (0.81–1.14)	0.86 (0.71–1.04)	0.94 (0.79–1.12)

* compared to baseline count, ** p > 0.05, CI: confidence interval.

4. Discussion

The population strategy to increase physical activity that was investigated in this pilot study was simple and cheap to implement. In summary, a significant increase in the use of stairs in women was noted and use remained at a higher level, even after the point-of-decision prompts had been removed. The change in use of stairs in women was, compared to the effect found in previous studies, considerable. Only a few previous studies have reported absolute increases in stair use as large as those found in women [13,21,22]. Remarkably, the use of stairs in women remained elevated, even after the prompts had been removed. This gives reason to believe that this type of population study can have an effect lasting longer than the intervention itself. Findings supporting this are found in previous studies that investigate the effectiveness of point-of-decision prompts. In a current systematic review Nocon *et al.* identified 10 studies that investigated the use of stairs after point-of-decision prompts had been removed. Of these 10 studies, seven showed that there was an effect after the removal of the posters [23]. However, point of decision prompts in our study, had no influence on the use of stairs in men. The results therefore show a sex specific effect that continued to exist after the intervention was over. Sex specific effects similar to these were also shown in previous studies, but with a nonuniform tendency [19,23–26].

Possible explanations for the lack of an effect in men include, that the message on the posters was not interesting to male passersby and therefore could not increase their motivation to use the stairs. It is also possible, however, that men are generally less receptive to appeals to change their behaviour and they would not have changed their behaviour, irrespective of the type of message that was posted. The sex specific difference could also be explained by the fact that men used the stairs more than women at the beginning of the study. An increase beyond the baseline use would therefore be harder to achieve in men. Similar results were also found in a previous study by Coleman *et al.* [21]. Other components that could influence effectiveness are, e.g., the visibility of the posters. This, however, is unlikely to be causal for a sex specific effect of point-of-decision prompts in our study, because positioning was chosen to allow for best possible visibility for passersby approaching escalators and stairs. In addition to the use of posters as point-of-decision prompts, some studies have investigated the effectiveness of other types of prompts, such as stairwell advertising, banners, posters of different sizes, different messages *etc.* They provided some evidence, that certain point-of-decision prompts could be more

effective to increase stair use than others [18,27,28]. While this knowledge will help to tailor future interventions, further research will be necessary to investigate these questions [29].

When interpreting findings of this pilot study, certain limitations should be noted. The pre- and post-intervention study design, and the consequent lack of an adequate control group, is of special importance. The relevance of external factors and their influence on the measured effect can therefore not be accessed adequately. Therefore, it cannot be excluded that the low number of women who used the stairs at baseline was a chance finding. Considering this, the increase in stair use in women could be interpreted as an artefact. Although the consistency in stair use in men throughout the study contradicts this interpretation somewhat, a study with a suitable control group is essential to interpret the results correctly. However, previous studies from other countries, investigating the effectiveness of point-of-decision prompts were also pre- and post studies in the majority of cases, thereby suffering from similar limitations. Another limitation of the present study is the relatively small extent of the information that was collected. Information regarding the age and constitution of the passersby would have been of interest, as would the qualitative aspects of the perception and evaluation of the posters. Moreover, it could be of great interest to investigate the effectiveness of this population strategy independently of regional characteristics. Selecting suitable underground stations in socioeconomic diverse regions, in different cities, and in different federal states would therefore be of great interest. In addition, the use of point-of-decision prompts could also be investigated in other environments, such as shopping malls and office buildings, where baseline rates of stair climbing might be different. The effectiveness of point-of-decision prompts in these other settings might therefore also differ from that in underground stations.

In summary, the present pilot study is, to our knowledge, the first that investigates point-of-decision prompts in Germany. It shows that use of point-of-decision prompts is feasible and provides some evidence that population strategies of this type can be associated with positive and meaningful behaviour changes. To confirm these findings and to identify the optimal type of message, further and methodologically rigorous investigations are warranted. These should include a control group study design, preferably a randomised controlled trial, including an economic evaluation in order to investigate effectiveness and cost-effectiveness of this preventive population strategy.

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