The differentiated effectiveness of a printed versus a Web-based tailored physical activity intervention among adults aged over 50

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Abstract

This study provides insight in the effectiveness of a print-delivered and a Web-based physical activity (PA) intervention (with or without additional environmental information on local PA possibilities) among people aged over 50. Intervention groups (print-delivered basic [PB; n = 439], print-delivered environmental [PE; n = 435], Web-based basic [WB; n = 423], Web-based environmental [WE; n = 432]) and a control group (n = 411) were studied in a clustered randomized controlled trial. Participants received three times tailored advice within four months, targeting the psychosocial determinants of PA, and additional environmental information (in two conditions). Outcome measures include weekly minutes and days of sufficient PA 6 months after the start, considering age, gender, educational level, body mass index, the presence of a chronic physical limitation and PA intentions as possible effect moderators. The results showed that the PB (B = 192.47; 95% CI = 75.24–309.71; P = 0.003), the PE (B = 229.31; 95% CI = 108.73–349.89; P = 0.001) and the WB-intervention condition (B = 214.25; 95% CI 88.65–339.85; P = 0.002) resulted in significantly increased weekly minutes of PA. Only the printed conditions resulted in increased days of sufficient PA (PB: B = 0.63; 95% CI = 0.35–0.92; P < 0.001; PE: B = 0.55; 95% CI = 0.26–0.85; P = 0.001). Additional environmental information did not increase intervention effects. Differences in effect were found between age and gender subgroups. In conclusion, both printed and Web-based interventions can be effective in increasing PA in adults aged over 50.

Background

Regular physical activity (PA) reduces the risks of multiple health problems, which often become more prevalent when people age [1–3]. Regular PA is particularly important for older adults to enable them to maintain their mobility and independence, to improve muscle strength, cognitive functioning, mental and emotional wellbeing and to prevent falls [2, 4–8]. Because of the aging population [9], stimulating PA among adults aged over 50 is of major relevance.

To stimulate PA initiation and maintenance among people aged over 50, the Active Plus intervention was developed [10, 11]. Active Plus is a computer-tailored intervention, including three times tailored advice, delivered during 4 months. The intervention can be delivered in a printed or in an online version, and included the possibility to provide participants with additional information on
The printed intervention has shown to be effective in stimulating PA among adults aged over 50 in previous studies on different data [12, 13]. However, since this print-delivered method is relatively labour intensive and expensive due to handling, printing and postage costs when compared with a Web-based delivery method, the print-delivered intervention was translated into a Web-based intervention (website and email delivered) [11].

Web-based tailoring offers several advantages over print-delivered tailoring such as the possibility to include more interactive applications, multimedia components and the option to deliver tailored feedback immediately, and might therefore have more potential to be effective than print-delivered tailoring. By our knowledge, no study has identified the differences in effect between a content identical intervention in a printed or in a Web-based delivery mode, in a population aged over 50. Although some studies in a younger population found print-delivered tailoring to be more effective [14, 15], other studies found that both interventions were equally effective [16–21]. Explanations for larger effects of print-delivered interventions could be that printed information might be more easy to read [22, 23], is more likely to be saved and re-read [22] and may elicit greater attention, potentially resulting in messages to be better processed than Web-based messages [14].

Especially in older populations, Web-based interventions are relatively new. However, older adults are one of the fastest growing online user groups [9], tending to have the most interest in (and need for) health-related information when compared with other age groups [21, 24]. However, differences in actual use of the Web-based interventions among different demographic groups are still present within this older population. Older people, females and low socioeconomic status (SES) groups tend to use the Internet less frequently than younger people, men or high SES groups [9, 25–29]. A previous study on the reach and attrition of the Active Plus intervention showed that people who started participating in the Web-based condition were significantly younger, were more often men, had a higher body mass index (BMI) and a lower PA intention than people who started participating in the printed condition [30]. Differences in effectiveness of a Web-based intervention when compared with a print-delivered intervention among these subgroups should be studied as well. Identifying which delivery mode is most effective in a particular subgroup might result in several implications for future research and can help intervention providers in selecting the most appropriate delivery mode of an intervention to optimize effectiveness of the intervention in a certain subgroup. Furthermore, previous studies have shown that the provision of environmental information could increase the intervention effect [31, 32]. Because the Web-based intervention included different options (i.e. more interactive) to include environmental information than the printed intervention, effectiveness of providing additional environmental information might differ between both delivery modes as well.

The purpose of the present study was to compare the effectiveness of a print-delivered to a Web-based tailored intervention (with or without additional environmental information) to stimulate PA among people aged over 50. Because previous studies, including our own, showed that the use of Web-based interventions might be related to participants’ age, SES, gender, BMI and the participants’ PA intention [9, 25–30], it was studied whether the intervention effect was influenced by these characteristics as well.

**Methods**

For the purpose of the study, a five-arm Randomized Controlled Trial was conducted, which was registered at the Dutch Trial Register (NTR2297) and approved by the Medical Ethics Committee of Atrium–Orbis–Zuyd (MEC 10-N-36).

**Participants and procedures**

Participants were recruited (2010–11) via direct mailing in the participating Municipal Health Council (MHC) regions (n = 6) [30]. To prevent subjects from different intervention conditions
contaminating each other, the different intervention conditions were located in different but comparable MHC regions. The regions were randomly assigned to the different intervention conditions (i.e. basic print-delivered, environmental print-delivered, basic Web-based, environmental Web-based) or a waiting-list control group, who did receive the Active Plus intervention after the study period ended. This indicates that all participants were randomly assigned through their region to one of the conditions, and were not able to make a choice in the delivery mode of the intervention. Each MHC provided a list of addresses of a random sample of eligible participants living in the selected matched regions. Participants had to be over 50 years of age (no maximum age) and need to have sufficient understanding of the Dutch language. By not including internet access as an inclusion criteria and choosing a design in which participants were not able to make a choice in the delivery mode of the intervention, optimal insight in the consequences for participation and effects could be provided when only one of the delivery modes would be used.

A power calculation (effect size $[\text{ES}] = 0.4$, power $= 80\%$, intracluster correlation coefficient $= 0.1$) showed that at baseline about 420 participants were needed per intervention condition (considering a dropout rate of 40% during the 1-year follow-up based on a previous Active Plus study). Figure 1 provides an overview of the number of invitations that were distributed to reach an even number of participants at baseline for each condition, and of the response and attrition during this study. Participants had to be over 50 years of age (no maximum age) and needed to have sufficient understanding of the Dutch language. By not including internet access as an inclusion criteria and choosing a design in which participants were not able to make a choice in the delivery mode of the intervention, optimal insight in the consequences for participation and effects could be provided when only one of the delivery modes would be used.

Invitations for the print-delivered intervention contained an information letter, a questionnaire, a pre-paid return envelope and a form to give informed consent. Invitations for the Web-based intervention contained a similar (printed) information letter, additional information about how to fill in a Web-based questionnaire, a personal username and password to log in to the Active Plus website. All participants provided informed consent.

**Study design**

The research conditions were studied in a clustered randomized control trial. There were evaluation assessments at the start (T0: also the database for the first- and second-tailored advice), 3 months after baseline (T1: also the database for the third tailored advice), and 6 months after baseline (T2; i.e. 2 months after completion of the intervention). For each follow-up assessment, participants of the printed intervention received an invitation by mail including the follow-up questionnaire. Participants of the Web-based intervention received the invitations by email, including a link to the Web-based questionnaire. Participants of the control group only received printed questionnaires and no advice.

**Tailored intervention**

Active Plus is a computer-tailored, theory- and evidence-based intervention to stimulate or maintain PA among people aged over 50 by targeting pre-motivational constructs (i.e. awareness, knowledge), motivational constructs (i.e. attitude, self-efficacy, social influence, intrinsic motivation and intention) and post-motivational constructs (i.e. strategic planning, action planning and coping planning) [10]. The intervention was developed using the Intervention Mapping protocol [33], and based on several theoretical models such as the I-Change Model [34], transtheoretical model [35], the health action process approach [36], the precaution adoption model [37], the self-regulation theory [38] and the self-determination theory [39]. Although several models and studies have emphasized the importance the participants’ perceptions of their environment in explaining PA behaviour [31, 40–46], additional environmental information was added to the intervention.
In a previous phase of the Active Plus project (2005–09), the printed intervention was proven to be effective in stimulating PA among the over-50s until 1 year after the intervention started [12, 13]. In a follow-up study (started in 2010), the intervention was adapted based on the results of the evaluation of the original (print-delivered) intervention, translated into a Web-based version [11] and implemented in

![Flow diagram of the reach and attrition of the different research conditions of the Active Plus intervention. Note: Percentages are reported in contrast to the number of baseline participants.](image-url)
an RCT in another region than the previous Active Plus intervention. The intervention was thus available in a printed and in a Web-based delivery mode, with and without additional environmental information, resulting in the aforementioned four intervention conditions. Intervention participants received three times tailored advice based on the answers given in previous assessments [10, 11]: (i) after the baseline assessment (immediate online advice for the Web-based condition, printed advice after 2 weeks in the printed condition); (ii) 2 months after the baseline assessment; and (3) within 4 months after baseline assessment, based on a combination of the first and the second assessment (immediate online advice for the Web-based conditions after filling in the second questionnaire; printed advice 2 weeks after filling in the second questionnaire in the printed condition).

The specific content of the basic tailored advice depended on the participants’ personal and psychosocial characteristics, PA behaviour and the extent to which they were planning to change their behaviour [10]. Participants received among others a graphic that provided insight in their own PA behaviour when compared with the average PA behaviour of similar others (same age and gender), model stories of similar others and information on the consequences of physical inactivity specifically for their own age group and gender. The intervention with additional environmental components contained the same information as the basic tailored intervention, with additional tailored advice on local PA possibilities and initiatives [47]. Participants received walking and cycling routes tailored to their own neighbourhood, home exercises tailored to their gender and information on sports opportunities tailored to the opportunities in the participants own neighbourhood, the presence of a chronic physical limitation and to the participants preferences (e.g. costs, inside or outside, being physically active with others or alone).

The content of the Web-based intervention was identical to the content of the printed intervention; however, the possibility to use interactive components was optimally used (i.e. static modelling pictures and PA exercises were transferred into videos; the printed neighbourhood map was transferred into a Google neighbourhood map; several hyperlinks and a forum were added to the webpage). One day after receiving the online advice, participants in the Web-based intervention received an email with a copy (pdf format) of their advice, enabling them to print and save their tailored advice. The advice sent by email had the same format as the printed version. The tailored advice contained between 5 and 11 pages of text and illustrations, depending on changes in PA behaviour and determinant scores. The tailored advice texts, in the printed letter or on the website, formed the basis of the Active Plus intervention. Intervention components (mainly expressed in pictures/figures/videos or schema’s) were added to the tailored advice to increase the active participation in the intervention. The ratio of pictures/figures/schemas to text was 1:2. The specific content of the theoretical methods, practical strategies and intervention components used in the current intervention have been described extensively elsewhere [47].

**Measures**

**Outcome measure**

Weekly days of sufficient PA and weekly minutes of PA were assessed at baseline, 3 and 6 months using the validated self-administered Dutch Short Questionnaire to Assess Health Enhancing Physical Activity (SQUASH) [48]. The reproducibility ($r_{\text{spearman}} = 0.58; 95\% \text{ CI} = 0.36–0.74$) and relative validity ($r_{\text{spearman}} = 0.45; 95\% \text{ CI} = 0.17–0.66$) of the SQUASH are reasonable for the general adult population [48]. A study of Wagenmakers et al. [49] showed that using the SQUASH in an older population can be considered as a fairly reliable tool as well ($r_{\text{spearman}} = 0.57$) and that the validity (varying between 0.20 and 0.67 when compared with the Actigraph) was comparable to those of other questionnaires. Weekly days of PA was measured with a single item: ‘On how many days per week are you, in total, moderately physically active by undertaking, e.g. heavy walking, cycling, chores, gardening, sports or other physical activities for at least 30 minutes?’
Weekly minutes of PA was calculated by multiplying the frequency (how many days per week) and duration (how many hours and minutes per day) of leisure and transport walking, leisure and transport cycling, sports, gardening, housework and doing odd jobs performed with moderate- and vigorous-intensity.

**Moderators**

Age, gender, educational level, BMI, the presence of a chronic physical limitation and PA intention were selected as potential moderators of the intervention effect, and were assessed in the baseline questionnaire. Educational level was categorized into ‘low’ (primary, basic vocational or lower general school) and ‘high’ (higher general secondary education, preparatory academic education, medium vocational school, higher vocational school or university level), according to the Dutch educational system. BMI was calculated by dividing self-reported weight by height in square metres. Participants were classified as being underweight (BMI < 18.5 kg/m²), healthy weight (BMI 18.5–24.9 kg/m²) or overweight (BMI > 25 kg/m²). The participants’ PA intention was assessed using three items on a 10-point scale (e.g. ‘To what degree do you intend to be sufficiently physically active?’; 1 = ‘Absolutely not’ to 10 = ‘Absolutely sure’).

**Statistical analyses**

**Baseline and dropout characteristics**

Baseline differences in participant characteristics and PA behaviour among the different research conditions were studied using univariate one-way analyses of variance and chi-square tests. Logistic regression analyses were used to study if there was a selective dropout between baseline and 6-month measurement. Remaining analyses were corrected for gender, age, BMI, educational level, the presence of a chronic physical limitation, intention and baseline PA. Analyses were conducted in SPSS 18.0.

**Intervention effect on PA**

Participants were nested within neighbourhoods resulting in the probability of interdependence between them. To account for this interdependence, multilevel linear regression analyses were performed with a random intercept for two levels [(i) individual and (ii) neighbourhood] to study the intervention effect on PA, and to compare the differences between the conditions. According to guidelines of the SQUASH [48], 18 respondents were excluded from the analyses because they reported PA levels of for more than 6720 min per week.

PA behaviour was regressed onto the dummies of the different research conditions (with the control group as a reference case), its baseline value and the covariates (gender, age, educational level, intervention type, BMI, intention, presence of a chronic physical limitation). To obtain a better interpretation of the intervention effects and a better comparison with other interventions, Cohen’s $d$ ESs were calculated for the intervention conditions when compared with the control group. ESs were defined as the difference between two means divided by the pooled standard deviations for those means, in which $d = 0.15$, 0.20 and 0.25 are considered for small, medium and large effects [50].

Analyses were applied to the total dataset, including missing data, since applying multilevel analyses to an incomplete dataset have been shown to give more accurate estimations than applying imputation methods [51]. Additionally, all analyses were repeated using the multiple imputation method (five times imputation based on the participants’ age, gender, baseline intention, and PA behaviour at baseline and after 3 months) for participants who did not fill in the 6-month questionnaire.

**Moderators of the intervention effect**

Interaction terms between the dummies of the intervention conditions and the participant characteristics (age, gender, educational level, BMI, the presence of a chronic physical limitation and PA intention) were added to the regression analyses to study whether the intervention effect was moderated by these characteristics. Because we aimed to study the absolute effect of these characteristics on the intervention effect, moderation analyses were performed per user characteristic separately. The other
participant characteristics were added as covariates in the model. When a significant interaction term was found, subgroup analyses were performed to study the difference in effect between the relevant subgroups.

Results

Characteristics of the study population

An overview of the number of participants who enrolled in this intervention and participated in the 6-month assessment is provided in Fig. 1. Dropout rates vary between the intervention conditions (i.e. dropout is higher in the Web-based conditions than in the printed conditions). As shown in Table I, significant differences between the research groups were found regarding their gender, age, BMI, the number of participants with a physical limitation, weekly days of baseline PA and compliance to the PA norm.

Dropout analyses showed that the lower the age of the participants ($B = -0.025; S.E. = 0.06; P < 0.001$) and the lower their PA intention ($B = -0.116; S.E. = 0.029; P < 0.001$), the less likely they were to fill in the 6-month questionnaire. Predictors of dropout did not differ between the intervention conditions. The effect analyses were adjusted for all demographic variables, intention and baseline PA.

Intervention effects on PA

Overall, the Active Plus intervention (i.e. provision of the four intervention conditions) was effective in increasing weekly minutes of PA ($B = 186.31; P = 0.001; ES = 0.30$) and weekly days of sufficient PA ($B = 0.33; P = 0.042; ES = 0.05$) 6 months after the start of the intervention. The intervention resulted in an average increase of 250 weekly minutes of PA and an increase 0.7 days of sufficient PA per week. More in-depth analyses into the different intervention conditions (see Table II) showed that the printed basic ($B = 192.47; P = 0.003; ES = 0.27$), the printed environmental ($B = 229.31; P = 0.001; ES = 0.35$) and the Web-based basic condition ($B = 214.25; P = 0.002; ES = 0.32$) were
effective in increasing minutes of PA when compared with the control group. The Web-based environmental condition was ineffective in increasing weekly minutes of PA \((B = 95.75; P = 0.142; ES = 0.24)\). The weekly minutes of PA increased on average 231 min by the printed basic condition, 276 min by the printed environmental condition, 283 min by the Web-based basic condition and (insignificantly) 142 min by the Web-based environmental intervention, whereas the control group only increased 49 min. Both the printed basic \((B = 0.63; P < 0.001; ES = 0.21)\) and the printed environmental condition \((B = 0.55; P = 0.001; ES = 0.28)\) were also effective in increasing days of PA when compared with the control group. Both groups increased their PA by 1 day per week. No significant effects on days of PA were found in the Web-based conditions. In both the printed and the Web-based condition, no significant difference in effect was observed between the basic and the environmental condition PA behaviour.

**Moderators of the intervention effect**

The effect of the printed environmental condition on minutes PA was moderated by the participants’ gender \((P = 0.015)\). The printed environmental intervention was only effective in increasing minutes of PA in women \((B = 356.67; P < 0.001; ES = 0.50)\) and not in men \((B = 89.06; P = 0.339; ES = 0.16)\). All other assessed user characteristics (i.e. age, BMI, educational level, intention and the presence of a chronic physical limitation) did not moderate the intervention effect on minutes of PA.

The effect of the printed basic condition on the weekly days of PA was moderated by the participants’ age \((P = 0.024)\). The printed basic condition resulted in higher effects on days of PA in participants aged 65 and older \((B = 0.95; P = 0.000; ES = 0.33)\) than in participants aged between 50 and 64 \((B = 0.43; P = 0.039; ES = 0.13)\). A borderline significant interaction was found between the printed environmental condition and the participants’ age \((P = 0.054)\), also showing higher effects in the older age group. Furthermore, the effect of the Web-based environmental condition on days of PA was moderated by the participants’ gender \((P = 0.019)\). Although the Web-based environmental condition resulted in a non-significant increase in days of PA in men \((B = 0.20; P = 0.386; ES = -0.05)\), it resulted in a decrease in days of PA in women \((B = -0.43; P = 0.051; ES = -0.30)\) when compared with the
control group. All other assessed user characteristics did not moderate the intervention effect on weekly days of PA.

Discussion

This study provides insight in the effectiveness of different versions of the Active Plus intervention to promote PA in adults aged over 50 and the possible moderators of the intervention effect.

Intervention effects on PA

Overall, the intervention was effective in increasing weekly minutes and days of sufficient PA 6 months after the start of the intervention. In-depth analyses showed that whereas the printed basic, the printed environmental and the Web-based basic condition resulted in an increase in weekly minutes of PA, no intervention effect was found in the Web-based environmental condition. Possibly, the provision of additional environmental information (i.e. the integration of hyperlinks with additional information) in the Web-based intervention might lead to not following the intended intervention pathway due to the distraction by visiting other websites, resulting in decreased intervention effects.

In general, no difference in effectiveness was found between the printed and the basic Web-based condition regarding the effect on minutes PA. These findings are in line with several other studies [16–19]. Since Web-based interventions might be less costly and easier to distribute, it is important to recognize that, also in an older population, Web-based interventions can be as effective as printed interventions.

Only the printed conditions were effective in increasing the weekly days of PA. This indicates that intervention participants in both delivery modes became more physically active; however, in the Web-based intervention group, the increase in minutes of PA is concentrated on fewer days than in the printed intervention group. Possibly, participants of the Web-based intervention group were younger, might be more often still working and might have more other social obligations.

They might therefore focus their increased PA only on certain days (e.g. weekend) on which they were already active for at least 30 min, while their PA behaviour did not change largely on other days.

A previous study on the Active Plus intervention [47] showed that participants of the print-delivered intervention reported a larger intervention use (i.e. 93–98% read, 70–77% kept and 40–57% discussed) than the Web-based intervention participants (i.e. 55–96% read, 40–56% kept and 17–32% discussed). Whereas, use and appreciation are pre-requisites for active information processing, which is necessary for achieving changes in determinants and health behaviour [52, 53], a higher effect on PA of the printed intervention could be expected when compared with the Web-based intervention. Possibly, the different delivery modes result in different information processing mechanisms. For example, the Web-based intervention includes more multimedia components, which may lead to better learning effects than static pictures [54, 55]. Furthermore, online feedback is delivered immediately following the questionnaire, eliminating a time lag between assessment and feedback which may increase information relevance and depth of processing, and thereby results in increased intervention effects [56]. These differences in information processing might result in equal overall effects between both delivery modes on minutes of PA despite differences in use. For an increase in days of PA, more active information processing might be needed, which might explain the lack of the online intervention on days of PA.

No significant difference in effect was observed between the basic and the environmental conditions. Receiving both a tailored advice and additional environmental information might be experienced as an information overload, and therefore did not result in significantly increased intervention effects.

When compared with a meta-analysis of internet-delivered interventions to increase PA that reported an overall ES of 0.14 [57], the ESs reported in the current study (varying from 0.16 to 0.35 between the intervention conditions) are remarkably high. Whereas a large proportion (~60%) of our study population does not have a paid job, the current
study participants might also have more time to improve their PA behaviour when compared with the general population (this might also explain the high baseline measures on PA, that are comparable to statistics in the Dutch population aged over 50 [9]).

A study on the health benefits of PA showed that every additional 15 min of daily exercise is expected to generate a reduction of 4% all-cause and 1% all-cancer mortality [58]. The improvements on PA reported in the current study (varying between 142 and 283 min per week), might thus (although not all statistically significant) have large implications for public health.

Differentiated effect by user characteristics

The printed conditions resulted in higher effects on days of PA in participants aged 65 and older than in participants aged between 50 and 64. This moderation effect was not found regarding the intervention effects on minutes of PA. Possibly, participants aged over 65 (who are mostly retired) have more possibilities to increase their amount of PA days in contrast to the younger (often working) age group.

The effect of printed and the Web-based environmental condition was moderated by the participants’ gender. Although the printed environmental condition was only effective in increasing weekly minutes of PA women and not in men, the Web-based environmental condition resulted in a decrease in days of PA in women. Possibly, the provision of the printed environmental information resulted, especially in men, in an information overload, resulting in decreased intervention effects. In older women, who have less experience in using the internet than men [9], the provision of the additional environmental information in the Web-based intervention might lead to loosing track of the intended intervention pathway (distracted by visiting other websites), resulting in decreased intervention effects.

The effect of the Web-based conditions was not moderated by the participants’ age or educational level, indicating that although the use of Web-based interventions is lower among older people and lower SES groups [9, 30], the intervention can be equally effective in these subgroups. The increased interactivity and the application of videos to the Web-based intervention might have increased the intervention effect in low SES groups [54, 59–62].

Methodological issues

To our knowledge, this is the first study that compared the effects of a Web-based intervention to a printed intervention in a population aged over 50. Although this study provides relevant and insightful data coming from a strong prospective design, some methodological issues should be noted. First of all, although analyses were corrected for the differences between completers and non-completers of the intervention, due to the selective dropout the overall results of this study might be biased. Second, the effect of Web-based intervention might be moderated by the participant’s familiarity/comfort with the internet. However, this is not assessed in the current study. Third, our measurements relied on self-reported data through validated questionnaires; the responses can be biased by social desirability. Although self-reports may be less accurate than objective observations, self-administered questionnaires are valid, most commonly used, and most inexpensive method to use in large-scale studies [63]. Validating intervention effects with objective measurements and studying the validity of the SQUASH within an older, online population would be recommendable. However, as the Active Plus intervention is supposed to be a low-cost and low-intensive intervention without personal contact with a professional, the use of additional tools to assess PA might bias the effects of the current intervention. When compared with a systematic review of PA questionnaires (with median validity coefficients varying from 0.30–0.39) [63], the validity of the SQUASH (0.58) is relatively high. Fourth, providing participant with the possibility to choose between the printed and the Web-based delivery mode might have resulted in a higher reach of the intervention [64, 65], and participating in the delivery mode of the participant’s preference might have increased the intervention effectiveness.

Finally, since applying multilevel analyses to an incomplete dataset have been shown to give more accurate estimations than applying imputation.
methods [51], only the results of the complete cases are discussed in this study.

Implications for practice and future research

In conclusion, our findings indicate that although only the printed intervention conditions were effective in increasing the weekly days of sufficient PA, both printed conditions and the basic Web-based condition were effective in stimulating weekly minutes of PA. The intervention can thus be implemented in practice in both delivery modes. The Web-based intervention was equally effective in participants of varying ages and in both low- and high-SES participants. Because the implementation costs of Web-based interventions are in general much lower and they require less intensive manual labour than printed interventions [11], providing participants aged over 50 with a Web-based intervention might be a cost-effective strategy to promote PA. More appropriate ways should be found to integrate the additional environmental information in the Web-based intervention to increase the effect of the Web-based environmental intervention. Because the printed intervention is more effective older participants (>65 years) and because the reach of the printed intervention is higher in an older population [30], providing the intervention in both delivery modes, and giving participant the choice for the delivery mode of their own preference might be the best option. More insight is needed in the (long-term) cost-effectiveness of Web-based interventions when compared with printed interventions in adults aged over 50.

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Conflict of interest statement

None declared.

References

Effectiveness and moderators of a tailored intervention


