Research Article

Evaluation of a nonrandomized workplace health promotion program in a Spanish multinational company and its effects on cardiovascular risk factors and weight-related outcomes

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Abstract

Objectives: The aim of this study was to evaluate the effects of a global health promotion intervention in the workplace on cardiovascular risk factors and weight-related outcomes in office workers after two years.

Methods: This nonrandomized retrospective observational study analyzed data of two medical check-up of 728 office workers, over 40 years old: intervention group (376) and control (352) at baseline and after 2 years of a global health promotion program (based on nutrition, physical activity, and mental health) of mixed approach (individual, group and organizational) in the workplace of the intervention group.

Results: Systolic and diastolic blood pressure experienced a statistically significant decrease (p < 0.05) at 2 years of -0.94 mm Hg and -0.79 mm Hg in the intervention group versus the control group whose changes were + 0.02 mm Hg and -0.38 mm Hg. Glucose also decreased 1.59 mg/dl more in the intervention group. Lipids, smoking, body mass index or waist circumference did not undergo relevant modifications.

Conclusion: This program improved blood pressure and glucose of office workers after two year follow-up, even among employees with low cardiovascular risk. However, according to the findings, this intervention was not as effective as expected in improving weight-related outcomes and cardiovascular risk in an office worker population.

Companies should strengthen, not only an overall health intervention, but also individual and personalized advice in the fight against cardiovascular risk.

Introduction

Health promotion initiatives can help prevent the onset of chronic diseases. Globally, chronic diseases have a high incidence and an impact on workforce patterns. Cardiovascular disease is one of the most important. Cardiovascular risk factors are preventable through the promotion healthy lifestyle [1].

Workplaces are a good setting for these interventions because of the potential reach [1–4]. In Spain, 62.7% of the working-age population [5], are employed and, spend an average of 1577 h annually at work [6]. They also offer easy access to occupational doctors and nurses.

The estimated prevalence of cardiovascular risk factors in the Spanish workforce population on average
is hypercholesterolemia at 49.16%, smoking at 43.20%, hypertension at 19.75% and diabetes at 2.83% [7–9].

The aim of this study was to evaluate the effects of a global health promotion intervention in the workplace on cardiovascular risk factors and weight-related outcomes in office workers after two years.

Methods

A nonrandomized retrospective observational study was conducted on a population of ≥ 40 years old office workers of a Spanish company in Madrid for two years (total N = 728), therefore, the current study includes the whole population that fulfills the following criteria. The final sample was divided into two cohorts based on exposure or not to a health promotion program implemented in June 2016 in the corporate headquarters of the company.

All employees included were in the same age group, had a university degree, similar income level, 1700 hours worked/year on average, identical occupational risks, and the same schedule. They received at least two regular medical check-ups at one of the company’s health centers before and after the intervention took place (2015-2018). Figure 1 shows a participant flow chart.

Cohorts

Intervention group: 376 employees working in the corporate headquarters (9 office buildings, company canteens, 2 sports centers, 2 medical centers for Health Surveillance and Occupational Risk Prevention).

Control group: 352 employees working in one of 372 small business offices in Madrid (non-exposed, neither company canteen, nor sports center/ medical center nearby).

Sample size

The Cochran formula for finite populations with a confidence level = 0.95 and for statistical power = 0.8 was used to calculate the sample size. There were 3481 employees ≥ 40 years old in the workforce at the corporate headquarters, at least 348 employees were needed in the intervention group.

Data collection

The procedures followed were in accordance with the Helsinki Declaration, as revised in 2013, on clinical research. Before the medical check-up, each employee gave informed consent, and confidentiality was respected as explained in Spanish Organic Law on Personal Data Protection 15/1999. Workers gave always their permission to extract data for epidemiological studies globally and anonymously.

After a query with the years of interest (2015–2018) and year of birth, we selected the medical records of the employees who met the inclusion criteria in AT MEDTRA software. Data were collected in an anonymous way in an Excel spreadsheet only by their employee number.

The staff members performing the assessments only knew the employee number.

Participants were not blinded to this intervention.

Baseline visit (t0)

- **Demographic variables**: age, sex, workplace, smoking [10], (non-smoker: never smoked, smoker: smoked 1 cigarette in the last 6 months and ex-smoker: ≥ 6 months since the last cigarette).

- **Medical history and pharmacological treatment**.

- **Physical examination**: blood pressure was measured with a calibrated OMRON-HEM-907 device. The employee was seated with his back supported without crossing his legs, no coffee or cigarette for the previous 30 minutes; after 5 minutes of quiet, the device took 3 measurements at 30-second intervals; the mean of the 3 results was taken as the value. If the result showed an elevated value, the employee was given another appointment that week to rule out hypertension. Hypertension [11–13], was considered high blood pressure if previously diagnosed by a physician and treated, or if systolic blood pressure (SBP) ≥ 140 mm Hg, diastolic blood pressure (DBP) ≥ 90 mm Hg on 2 or more occasions.

- **Weight-related outcomes**: weight (in kilograms with a TANITA WB 100 PMA, without shoes and with light clothing), height (in centimeters, a measuring rod was used with feet together, back straight, heels supported), body mass index (BMI = Weight (kg) / Height (m))², waist circumference (in centimeters, was measured with a GulicK II tape measure model 67020, the person

Figure 1: Flowchart for the inclusion and exclusion procedure.
should be standing, with feet together, arms at the sides and abdomen relaxed, and then surround the abdomen with the tape measure at the level of the navel and without pressing, take a deep breath in and then out, abdominal obesity (14), was considered if men ≥ 102 cm or if women ≥ 88 cm).

- Electrocardiogram

- Results of blood test were measured using automated techniques: glucose levels (diabetes if glucose ≥ 126 mg/dl [15]) and lipids (total cholesterol, and its fractions and triglyceride, dyslipidemia [16], if total cholesterol ≥ 250mg, LDL-cholesterol ≥ 130 mg/dl, HDL-cholesterol < 40 mg/dl or triglycerides ≥ 200 mg/dl).

- Cardiovascular risk estimation: SCORE tables for the low-risk population [17].

- A report was delivered with personalized recommendations.

- Post-intervention visit (t3): same as t0 after two years.

**Intervention**

The intervention was based on the social–ecological model [18]: the organizational dimension (refers to a healthy environment and atmosphere in the workplace, was delivered to all employees in headquarters), the interpersonal dimension (based on relationships with colleagues, group activities were performed in the workplace) and individual factors (personal counseling that encourages all workers to know their health parameters, set goals and specific actions to achieve them).

Included actions related to nutrition, physical activity, and mental health. Multiple health professionals were involved. This intervention consisted of:

**A common part**

- **A website:** Staff could find information on the program. It provided tests on nutrition and physical activity to update the start point.

- **A monthly agenda with healthy activities and recipes** were emailed to all employees.

- **An annual healthy month was held in the workplace with activities that required the active participation of the employee to learn healthy lifestyle habits, including an intensive week dedicated to health.**

**A Specific part:** Nutrition/Food: Information on healthy eating was posted with short videos and pills.

Advance information about the weekly menu at the canteen was delivered to all employees, including macro/micronutrient groups and calories.

The canteen menu was adapted to the Mediterranean pattern diet (fruits, vegetables, legumes, nuts, whole grains, and extra virgin olive oil) and reduced salt content.

Information on healthy eating and salt consumption was provided on the canteen paper tablecloths.

Ultra-processed foods were eliminated in favor of nuts or fruit in the vending machines and at the takeaway point. Healthy products were pointed and placed at first sight.

Employees were able to measure blood pressure and calculate individual cardiovascular risk. After that, they receive written recommendations, a book of low-salt recipes, and another one of healthy recipes. The activity lasted 3 months every year.

During the healthy week, free healthy cooking workshops were offered.

The staff received a healthy breakfast for free one day during the healthy month.

A half-price voucher was promoted for 10 individual nutrition consultations in the headquarters medical center.

**Physical activity:** Short videos and pills were posted to avoid a sedentary lifestyle. Applications for staying active were published on the web.

**The company launches a challenge:** Go around the world walking for one month. Each employee would try to achieve 10,000 steps/day in that period. Employees could donate the daily steps into a collective register for charitable purposes.

They also used different information channels (workplace screens: cafeterias, computer screen saver, elevator, or intranet) to encourage daily physical activity. Some of the messages were: walking at least 20 minutes/day, parking 1 kilometer farther from the destination or getting off one stop before the bus/metro, using stairs, and using the lunch break to walk. Breaks during work hours to stretch were celebrated too.

During healthy month, a solidarity soccer tournament and race were held in the workplace (the fee went to a charity organization). In addition, new gym memberships at the workplace sports center were at half price for the first six months during that time.

An interactive bracelet was delivered to all employees to measure physical activity.

Employees’ membership fees at gyms near their workplace and/or residence were cheaper using the collective company policy.

Monthly classes in new sports were held in the workplace for free to motivate employees to keep moving.

Different sports competitions were organized during the year in the workplace sports center.

Annually, employees were given a free individual pilates class and a back-school workshop that taught them a healthy ergonomic posture during the workday.

**Mental health:** guidelines to manage stress and flexible scheduling during the workday were offered to everyone as
well as vacation purchases (employees were able to purchase 5 additional days of vacation/year that were deducted from their salary). Free workshops to deal with stress, to enhance positive emotions, outdoor yoga workshops, and meditation or mindfulness courses were proposed annually for all the staff.

Statistical analysis

Analyses were performed at the individual level.

R program version 3.3.3 and RStudio version 1.2.5033 were used.

Quantitative variables were described using the mean and standard deviation (SD). Qualitative variables were described using absolute frequency and relative frequency by percentages. For statistical inference, the normality of the sample was checked (Shapiro-Wilk test, Jarque-Bera test), homoscedasticity (Barlett test, Levene test) and sample was checked (Shapiro-Wilk test, Jarque-Bera test), and finally, it was analyzed whether the samples were paired or independent to choose the appropriate test: Wilcoxon, Student’s t – test paired or independent samples, Welch’s t-test independent samples, Mann–Whitney U test paired samples. It was a bilateral analysis.

Pearson’s Chi-squared test was used for categorical variables.

A value was statistically significant if p < 0.05.

Results

728 workers have included: 307 women (42.17%) and 421 men (57.83%) with a mean initial age of 48.5 years and final age of 51.28 years.

The intervention and control group did not statistically differ with respect to most of their baseline characteristics, but the intervention group formed a significantly lower baseline frequency of hypertensive workers (p = 0.0073), as well as lower waist circumference levels (p = 0.0345), BMI levels (0.0184) and LDL–cholesterol levels (p = 0.0212). Tables 1, 2 present the characteristics of the study population at baseline and post-intervention analysis.

Table 3 shows the prevalence of the risk factors studied.

The website of the program had 1500 views/month on average (different IP addresses) up to 3400 views during the healthy month. Every year: 4600 healthy breakfasts were delivered, 1100 workers got to know their blood pressure and cardiovascular risk, and 40.6% of employees at headquarters completed the challenge of a round-the-world walk. 315 people ran and played soccer for charity purposes. On average 150 workers attended to try monthly new sports. More than 350 healthy recipes were available for employees. 720 workers adhered to the gym promotion. 2325 employees enjoyed the pilates free class. Nutrition consultations (691 to 1662) and daily canteen menu (3806 to 6255) grew exponentially over two years. Sport center members at the workplace slightly increased after the follow-up (2973 to 3004).

The SBP and DBP showed statistically significant changes (p < 0.05) after two years of intervention. A decrease in SBP (-0.94 ± 0.49 mm Hg, CI = 95%) on average) was observed in the intervention group as opposed to the control group where there was a rise in t1 (+ 0.02 ± 0.55 mm Hg, CI = 95%) on average). DBP decreased in both groups: in the intervention group, the decrease was 0.79 ± 0.42 mm Hg (CI = 95%), more than double that in the control group (0.38 ± 0.46 mm Hg (CI = 95%)).

Segmented by sex, the drop was observed in men in both groups but not in women. Men in the intervention group showed greater decrease than the control group in SBP (-2.34 ± 0.60 mm Hg (CI = 95%) versus -1.45 ± 0.63 mm Hg (CI = 95%)) and DBP (-1.35 ± 0.54 mm Hg (CI = 95%) versus -1 ± 0.59 mm Hg (CI = 95%)). In women, the trend was upward in both groups, although the increase was greater in the control group (SBP + 1.8 ± 0.80 mm Hg (CI = 95%) and DBP + 0.38 ± 0.69 mm Hg (CI = 95%)) with respect to the intervention...
Table 2: Post-intervention characteristics of the participants for each cohort (N = 728).

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Total</th>
<th>Women</th>
<th>Men</th>
<th>Total</th>
<th>Women</th>
<th>Men</th>
<th>p - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>49.91 ± 4.09</td>
<td>50.14 ± 3.40</td>
<td>49.77 ± 4.49</td>
<td>52.69 ± 4.64</td>
<td>51.70 ± 4.34</td>
<td>53.51 ± 4.73</td>
<td>&gt; 0.999</td>
</tr>
<tr>
<td>SBP mm Hg</td>
<td>114.49 ± 12</td>
<td>109.5 ± 12.1</td>
<td>117.73 ± 10.79</td>
<td>117.34 ± 13.67</td>
<td>112.49 ± 13.93</td>
<td>121.34 ± 12.09</td>
<td>0.0079</td>
</tr>
<tr>
<td>DBP mm Hg</td>
<td>71.6 ± 8.79</td>
<td>69.87 ± 8.61</td>
<td>72.72 ± 8.75</td>
<td>73.51 ± 9.11</td>
<td>71.34 ± 9.61</td>
<td>75.31 ± 8.28</td>
<td>0.0055</td>
</tr>
<tr>
<td>Glucose mg/dl</td>
<td>203.93 ± 33.02</td>
<td>205.65 ± 30.03</td>
<td>202.82 ± 34.84</td>
<td>205.42 ± 32.23</td>
<td>208.24 ± 30.19</td>
<td>203.09 ± 33.72</td>
<td>0.5171</td>
</tr>
<tr>
<td>HDL-chol mg/dl</td>
<td>57.94 ± 15.81</td>
<td>66.51 ± 15.42</td>
<td>52.38 ± 13.41</td>
<td>56.7 ± 13.48</td>
<td>62.92 ± 13.01</td>
<td>51.58 ± 11.61</td>
<td>0.055</td>
</tr>
<tr>
<td>LDL-chol mg/dl</td>
<td>127.3 ± 28.93</td>
<td>122.97 ± 26.35</td>
<td>130.11 ± 30.22</td>
<td>129.11 ± 26.04</td>
<td>130.05 ± 28.49</td>
<td>130.83 ± 28.01</td>
<td>0.4761</td>
</tr>
<tr>
<td>TG mg/dl</td>
<td>93.69 ± 46.53</td>
<td>80.84 ± 35.01</td>
<td>102.03 ± 51.05</td>
<td>93.33 ± 44.91</td>
<td>81.06 ± 35.15</td>
<td>100.44 ± 49.43</td>
<td>0.982</td>
</tr>
<tr>
<td>BMI</td>
<td>90.8 ± 12.21</td>
<td>83.31 ± 10.57</td>
<td>95.65 ± 10.66</td>
<td>92.88 ± 12.09</td>
<td>86.9 ± 10.77</td>
<td>97.8 ± 10.86</td>
<td>0.0309</td>
</tr>
<tr>
<td>Waist circumference (cm)</td>
<td>86.9 ± 10.77</td>
<td>86.3 ± 10.77</td>
<td>97.8 ± 10.86</td>
<td>97.8 ± 10.86</td>
<td>97.8 ± 10.86</td>
<td>97.8 ± 10.86</td>
<td>0.0309</td>
</tr>
</tbody>
</table>

Results are shown as means (standard deviations). Statistical differences are depicted in bold. [BMI: Body Mass Index; cm: centimeters; DBP: Diastolic Blood Pressure; HDL-chol: High-Density Lipoprotein Cholesterol; LDL-chol: Low-Density Lipoprotein Cholesterol; mg/dl: milligrams per deciliter; mm Hg: millimeter of mercury; SBP: Systolic Blood Pressure; TG: Triglycerides].

Table 3: Prevalence of cardiovascular risk factors. Statistical differences are depicted in bold.

<table>
<thead>
<tr>
<th>Cardiovascular Risk Factors</th>
<th>N</th>
<th>Relative frequency %</th>
<th>Chi2 p - value for difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-normal Blood pressure</td>
<td>33</td>
<td>8.78</td>
<td>p = 0.8793</td>
</tr>
<tr>
<td>Hypertension</td>
<td>49</td>
<td>13.03</td>
<td>p = 0.0073</td>
</tr>
<tr>
<td>Diabetes</td>
<td>5</td>
<td>1.33</td>
<td>p = 0.35</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>275</td>
<td>73.13</td>
<td>p = 0.1339</td>
</tr>
<tr>
<td>Smoking</td>
<td>76</td>
<td>20.21</td>
<td>p = 0.9332</td>
</tr>
<tr>
<td>Overweight</td>
<td>62</td>
<td>17.62</td>
<td>p = 0.7988</td>
</tr>
<tr>
<td>Obesity (BMI ≥ 30)</td>
<td>55</td>
<td>14.63</td>
<td>p = 0.1954</td>
</tr>
<tr>
<td>Abdominal Obesity</td>
<td>88</td>
<td>23.41</td>
<td>p = 0.0025</td>
</tr>
<tr>
<td>Sedentary lifestyle</td>
<td>146</td>
<td>38.83</td>
<td>p = 0.7332</td>
</tr>
</tbody>
</table>

BMI: Body Mass Index; C: Control Group; I: Intervention Group; t₀: baseline; t_f: follow up
group (SBP $+1.24 \pm 0.76$ mm Hg (CI = 95%) and DBP $+0.07 \pm 0.65$ mm Hg (CI = 95%).

The glucose of the employees in both groups decreased during the follow-up. In the intervention group, it decreased by $6.04 \pm 0.45$ mg/dl (CI = 95%) on average in a statistically significant way compared to the control group ($-4.45 \pm 0.50$ mg/dl (CI = 95%)). The control group also showed a statistically significant decrease after follow-up. These differences were greater in men ($-11.71 \pm 0.60$ mg/dl (CI = 95%) in the intervention group versus $-5.84 \pm 0.69$ mg/dl (CI = 95%) in the control group) than in women ($-4.99 \pm 0.60$ mg/dl (CI = 95%) versus $2.7 \pm 0.71$ mg/dl (CI = 95%).

Lipids did not show statistically significant changes after the follow-up (total cholesterol increased so did LDL-cholesterol and HDL-cholesterol). Neither did BMI nor weight nor waist circumference (Table 4), smoking, or SCORE cardiovascular risk categories (Table 5). Segmented by gender, women in the intervention group increased a minimum level of their waist circumference in contrast to the control group in a significant way ($p = 0.0018$) after the follow-up.

**Discussion**

The intervention shows a positive influence in decreasing blood pressure values, both SBP and DBP after 2 years. It is a modest decrease since only a decrease in salt consumption to 5–6 g/day for more than four weeks in normotensive individuals reduces the SBP by 2.42 mm Hg and DBP by 1 mm Hg [19] but it reinforces and improves the result obtained in studies on the working population by improving both values (SBP and DBP) in a statistically significant manner.

In contrast to the good result observed in this study (SBP $-0.94 \pm 0.49$ mm Hg), Engbers, et al. [20] found an increase in SBP of 3 mm Hg 3 and 12 months after their intervention in office workers.

Like us, Ryu, et al. [18], found a decrease in DBP with their intervention ($-3.45$ mm Hg at 6 months). Their result is greater than the one presented in this paper, although the sample was much smaller (30 participants), with no effect on SBP.

The findings presented in men (SBP $-2.3 \pm 0.60$ mm Hg and DBP $-1.35 \pm 1.6$ mm Hg at $t_f$, both statistically significant) were similar to Groeneveld’s findings, et al. [21] in construction workers (DBP drop statistically significantly after 6 months of intervention by 1.7 mm Hg, maintained at 12 months and a nonsignificant decrease of $-2.2$ mm Hg in SBP). Scapellato, et al. [22] obtained a greater decrease at 6 months: SBP of $-4.4$ mm Hg and DBP of $-2.5$ mm Hg in healthcare workers.

This research shows a tendency of the program to reduce glucose in a statistically significant way (this parameter decreased $1.59 \pm 0.48$ mg/dl (CI = 95%) more in the intervention group ($t_f$) vs baseline ($t_0$)) and HDL-cholesterol ($t_f$) ($p = 0.0118$) versus the control group ($t_f$) ($p = 0.0338$).

<table>
<thead>
<tr>
<th>Table 4: Bilateral statistical inference analysis. Evolution of the variables in both cohorts. Statistical differences are depicted in bold.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control vs intervention</td>
</tr>
<tr>
<td>SBP</td>
</tr>
<tr>
<td>p-value</td>
</tr>
<tr>
<td>DBP</td>
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<tr>
<td>p-value</td>
</tr>
<tr>
<td>Glucose</td>
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<tr>
<td>p-value</td>
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<tr>
<td>Cholesterol</td>
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<tr>
<td>p-value</td>
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<tr>
<td>HDL-chol</td>
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<td>p-value</td>
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<tr>
<td>LDL-chol</td>
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<td>p-value</td>
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<tr>
<td>TG</td>
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<tr>
<td>p-value</td>
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<tr>
<td>BMI</td>
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<tr>
<td>p-value</td>
</tr>
<tr>
<td>Waist circumference</td>
</tr>
<tr>
<td>p-value</td>
</tr>
</tbody>
</table>

BMI: Body Mass Index; cm: centimeters; DBP: Diastolic Blood Pressure; HDL-chol: High-Density Lipoprotein cholesterol; LDL-chol: Low-Density Lipoprotein cholesterol; mg/dl: milligrams per deciliter; mm Hg: millimeter of mercury; SBP: Systolic Blood Pressure; $t_0$: baseline; $t’$: post-intervention; TG: Triglycerides.

<table>
<thead>
<tr>
<th>Table 5: SCORE cardiovascular risk categories.</th>
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<tbody>
<tr>
<td>SCORE [17]</td>
</tr>
<tr>
<td>------------------------------------------------</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>I Group $t_0$</td>
</tr>
<tr>
<td>C Group $t_0$</td>
</tr>
<tr>
<td>I Group $t_0$</td>
</tr>
<tr>
<td>C Group $t_0$</td>
</tr>
</tbody>
</table>

C: Control Group; I: Intervention Group; $t_0$: baseline; $t’$: follow up

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check-ups are voluntary, this sample may only reflect data from those workers most interested in their health. For this same reason, it was not possible to measure the impact on the results of single actions of the intervention since it was not recorded in how many of the proposed activities the employees were involved in. The previous differences related to hypertension population, BMI, waist circumference, or LDL cholesterol are a limitation of this study, but the good result of BP in the end, in the best baseline group (intervention) makes this company’s effort on promotion worthwhile.

Despite these findings seeming discrete for clinical practice, the increase in the age of the population studied during the follow-up and the real possibility of an increase in blood pressure and glucose values, make these findings relevant.

Cholesterol, its fractions, and triglycerides worsened in both groups contrary to other studies that improved HDL-cholesterol such as Engbers, et al. [20] at 3 and 12 months or Groeneveld, et al. [21] at 12 months. Contrary to what was found after this program, Scapellato, et al. [22] described a decrease in LDL-cholesterol at 6 months (-3.4 mg/dl).

Unexpectedly, weight, BMI, and waist circumference did not suffer significant changes despite the adaptation of the canteen menu to the Mediterranean diet and the results published by other investigators [18,22]. The case of the women deserves further research.

The prevalence of the cardiovascular risk factors is slightly different from that estimated in other studies including the Spanish working population [7-9]: frankly better in the sample studied with regard to smoking (it was around 20%), slightly lower for hypertension, especially in the intervention group where the maximum prevalence estimated was 15.69% in t3 or in the case of diabetes which did not exceed 4% in either cohort.

On the other hand, the prevalence of dyslipidemia exceeded 50% in both groups, being greater than in the investigations of Martínez-Abadía, et al. [8] or Alvarez–Fernandez, et al. [9] and similar to the results of Sanchez-Chaparro [7]. The difference in diagnostic criteria over the years could explain part of the difference.

Limitations

Because it is a retrospective study and company medical check-ups are voluntary, this sample may only reflect data from those workers most interested in their health. For this same reason, it was not possible to measure the impact on the results of single actions of the intervention since it was not recorded in how many of the proposed activities the employees were involved in. The previous differences related to hypertension population, BMI, waist circumference, or LDL cholesterol are a limitation of this study, but the good result of BP in the end, in the best baseline group (intervention) makes this company’s effort on promotion worthwhile.

Conclusion

This global health promotion program based on diet, physical activity, and mental health has shown a positive trend in improving blood pressure and glucose of office workers after a short, but longer than 1-year follow-up.

This workplace intervention of a mixed approach (individual, group, and work environment) to promote healthy habits improves some cardiovascular risk factors after more than a year of follow-up, even among workers with low cardiovascular risk such as those in this study.

However, according to the intervention was not as effective as expected in improving weight-related outcomes and cardiovascular risk in an office worker population.

Companies should strengthen, not only an overall health intervention but also individual and personalized advice in the fight against cardiovascular risk factors in the long term. Special attention should be paid in the future to a personalized approach to workplace health promotion. We should try to focus our efforts on the employee’s individual needs in order to make a difference.

New actions to control participants’ compliance and the lifestyle changes achieved should be studied.

References


