Community Medicine & Health Education

Rullán et al., J Community Med Health Educ 2014, 4:4
http://dx.doi.org/10.4172/2161-0711.1000303

Research Article Open Access

Effects of a Comprehensive Health and Wellness Program on Administrative Employees of a Corporation in Mexico

Alejandra Rullán[1], Jimena García[2], Marghel Alvarez[2], Juan O Talavera[3,6], YiFang Chu[2] and Patricia Clark[4,5]*

[1]Mead Johnson Nutrition; formerly PepsiCo Mexico
[2]PepsiCo Mexico
[3]Centro de adiestramiento en investigación clínica. IMSS
[4]Unidad de Epidemiología Clínica Hospital Infantil de México
[5]Universidad Nacional Autónoma de México
[6]Centro de investigación en ciencias médicas. UAE
[7]PepsiCo Global R&D Nutrition, Barrington, IL, USA

Abstract

Background: The workplace is one of the most important settings for health promotion, because it directly affects the physical, mental, economic, and social well-beings of workers and their families, as well as the communities and society where they live. In Mexico, approximately 40% of deaths occur in economically productive age groups due to health conditions associated with chronic diseases. Most of the deaths may be preventable with a healthy lifestyle, since diet and physical activity have been shown to significantly reduce the disease risks. In our study, we measured the effects of a health and wellness program, *Vive Saludable ADN*, on some markers of health of administrative staff of a corporation in 2008 and 2009. The program had three components, physical activity (A), rest (D) and nutrition (N), with a clear intervention strategy for each component, and used the appropriate in-house facilities and full-time nutritionists to help implement the interventions. The main strength of this program consisted in blending the components in parallel.

Methods: Anthropometric, clinical, and biochemical measurements were performed at baseline and after 6-months of nutritional (N) and physical activity (A) interventions in 712 participants at the corporation. With recommendations of apply rest (D) in their day to day work life. The numbers of steps walked and nutritional guidance visits made were used to establish compliance, and were an essential part of the data analysis. Baseline and post-intervention data were compared using Wilcoxon tests, with statistical significance set at $p<0.05$. Intent-to-treat analysis was performed based on compliance defined as completing >80% of the recommended walking of 10,000 steps a day for the physical activity intervention and completing >80% of the recommended visits with a nutritionist for the nutrition intervention.

Results: The program significantly reduced their BMI by 1.23%, waist circumference by 0.37%, total cholesterol level by 3%, and triglyceride level by 1.71% in the whole group, but higher and significant reductions were observed among the participants who comply with both physical activity and nutritional interventions (BMI, waist circumference, and total cholesterol and triglyceride levels by 2.47%, 5.30%, 6.00%, and 12.29%, respectively).

Conclusions: The *VS ADN* program improved the health status of the corporation workers. The nutritional intervention-compliant group had better biochemical outcomes than the physical activity intervention-compliant group but participants who complied with both interventions gained significantly greater health benefits.

Keywords: Workplace; Health promotion; Cardiovascular diseases; Exercise, Patient compliance

Introduction

According to the 2004 Global Burden of Disease Study, 50 million people die every year in the world. Of these deaths, 28% occur in individuals aged 15-59, an age group considered economically productive. Six out of every ten deaths are due to non-communicable diseases, with ischemic heart diseases and stroke being the two leading causes of death worldwide [1]. In Mexico, about 40% of deaths occur in individuals aged 15-64 being diabetes mellitus and ischemic heart disease the leading causes of death according to SINAIS 2008 [2].

Obesity, insufficient physical activity, smoking, and low consumption of fruits and vegetables are associated with these chronic diseases that led to work absenteeism and loss of productivity. The workplace offers an ideal setting to improve workers' health, because it directly affects the physical, mental, economic, and social well-beings of workers and their families. The World Health Organization places the workplaces, along with schools and hospitals, as one of the priority settings for health promotion in the 21st century [3,4]. Employee-oriented health programs lead to improved health, a safer work environment, enhanced self-esteem, reduced stress, increased job satisfaction and a sense of well-being. Work organizations also experience reduced staff turnover and absenteeism, increased productivity, decreased healthcare costs, and a better corporate reputation as a result of these health programs [5,6].

Health promotion interventions may focus on a single factor or on multiple factors with a comprehensive approach. The latter acknowledges the combined influences of personal, environmental, organizational, communal, and societal factors on employee health [7-9]. Adherence to health promotion interventions has been associated with better management of metabolic syndrome, and with significant reductions in the risk of chronic diseases [10,11]. For example, adherence to a healthy lifestyle including diet, physical activity, and no smoking is associated with lower lipid levels, reduced risk of metabolic

***Corresponding author:** Patricia Clark, MD PhD, Head, Clinical Epidemiology Unit, Hospital Infantil Federico Gómez, Faculty of Medicine UNAM, Mexico, Tel: (5255) 52 28 99 17, Ext 2525; E-mail: patriciaclark@prodigy.net.mx

Received July 07, 2014; **Accepted** August 24, 2014; **Published** August 29, 2014

Citation: Rullán A, García J, Alvarez M, Talavera JO, Chu YF, et al. (2014) Effects of a Comprehensive Health and Wellness Program on Administrative Employees of a Corporation in Mexico. J Community Med Health Educ 4: 303. doi:10.4172/2161-0711.1000303

syndrome, and lower general mortality [12,13].

With this background in mind, since 2003, the Nutrition Department at the PepsiCo Mexico Company has developed and implemented the *"Vive Saludable ADN"* (**A**ctividad Fisica, **D**escanso, **N**utrición) program-Live Healthy ADN (Physical Activity, Rest, Nutrition) — for its employees. It was anticipated that the workers who participate in the program will have a positive impact in some of their anthropometric, clinical, and biochemical markers, therefore, the aim of the present study is to analize and report the before and after impact, of the program in different outcome measurements (anthropometric, clinical, and biochemical markers) on the administrative employees who participated for 6 months in the program in 2008 or 2009.

Methods

Study population

The Vive Saludable ADN program was given to PepsiCo Mexico administrative staff for 6 months, from April to October in 2008 or 2009, at six corporate offices in three states of the country-Mexico City, Guadalajara and Monterrey. The study protocol was reviewed and approved by the Ethics Commission of the Faculty of Medicine Faculty from the National University of Mexico.

Participants joined the program voluntarily via an invitation sent to 2300 administrative staff employees each year. During the two enrollment years, 1163 applications were received and 848 subjects (401 in 2008 and 447 in 2009) accepted. Prior to the baseline assessments, the study purposes were explained to and written agreements were obtained from all the participants.

The Vive Saludable ADN Program

The Vive Saludable ADN program promotes health through physical activity (A), rest (D), and nutrition (N). The physical activity component of the program recommended participants walking 10,000 steps every day measured by a pedometer provided to them with the operating instructions at the beginning of the program. The nutrition component recommended each participant completing a 15 to 30- minute visit, once every 2 weeks on average, with a nutritionist trained for this program. The dietary guidance was provided using the Good Eating Plate, (Mexican Dietary Guidelines), and promotion the consumption of fruits and vegetables, portion control, hydration, and label-reading. A clinical nutritional assessment and a personalized dietary plan were provided throughout the 6-month program. One key objective of the nutritional intervention was to teach the participants how to integrate a proper diet into the physical activity and rest interventions of the program. Additionally, for the rest component, the nutritionists recommended to the participants to took one 15 minutes or two 10 minutes work breaks, either individually or in groups, as a healthy pause to doing stretching exercises, and having one massage per program period. As part of the employees' benefits package since 2003, this program was provided free to the participants. The main strength of this program was the three-component health interventions with the use of the appropriate in-house facilities and full-time nutritionists.

The environmental intervention complementing the VS ADN program included open and free use of the gyms on the premises, four different aerobic activity options through group fitness lessons, running clubs, educational newsletters on nutrition, physical activity and rest, and conferences on healthy lifestyle-related topics for employees.

Program compliance was defined as fulfilling the following criteria: a) completing >80% of the recommended walking of 10,000 steps a day and/or b) completing >80% of the recommended visits with a nutritionist.

Data collection

Anthropometric, clinical, and biochemical assessments were performed at baseline and at the end of the study. They included weight, body mass index (BMI), body fat percentage (measured with a Tanita BC-418 (Tanita Corporation of America, Inc., Arlington Heights, Illinois, USA or an OMRON HB-306 body composition analyzer), abdominal circumference (measured with a Gulik fiberglass tape measure), blood pressure (measured with a CITIZEN CH-656C or an OMRON HEM-631INT wrist blood pressure monitor), height (measured with a SECA portable stadiometer), and levels of fasting blood glucose, total and high-density lipoprotein (HDL) cholesterol, and triglycerides measured by spectrophotometric methods at a certified laboratory.

For the physical activity evaluation, the self-reported numbers of steps were measured using the OMRON HJ-105 pedometers in 2008 and the HJ-150 model in 2009. The frequency and duration of complementary physical activity not recorded by the pedometer was obtained by self-reporting as well of the frequency and amount of healthy pauses taken.

Data analysis

Data were stratified by gender. Descriptive analyses, including frequencies and proportions, means and standard deviations, median and percentiles were performed based on the numbers of subjects available for each variable. Differences between the baseline and post-intervention values were evaluated using the Wilcoxon tests, with statistical significance set at $p<0.05$. Intent-to-treat analysis was performed based on adherence to the physical activity and/or nutritional interventions. Statistical analysis was performed using SPSS for Windows, version 18.0 (Statistical Product and Service Solutions, Chicago, IL, USA).

Results

Of the 848 participants in the study, 136 were excluded due to pregnancy (n=5), blood pressure ≥140/90 mm Hg, triglyceride levels >800 mg/dL, and/or glucose levels >140 mg/dL (n=131), since these physiological conditions and their clinical treatments would be potential confounding factors for the study. Thus, 712 subjects met our established criteria, and were enrolled to complete the program. Table 1 shows the demographic characteristics of the study population; it had an average age of 32.2 ± 6.7 years, with 53.4% of it being female, 95.2% having a college or higher degree, and 58.5% identifying them as being single. Over 50% of the participants ware enrolled in the Mexico City office.

The baseline characteristics of the study population are shown in Table 2. When the whole study population was analyzed, its median BMI was 25.11 kg/m^2, with 52.5% of the population being overweight (defined as BMI ≥25) or obese (defined as BMI ≥30). The median baseline levels of Glucose (88 mg/dL), total cholesterol (195 mg/dL), triglycerides (117 mg/dL), and systolic and diastolic blood pressure (113/72 mmHg) were all within their respective normal ranges.

When data were stratified by gender the following differences were found: women had a normal median BMI of 23.60 kg/m^2, whereas men had the median BMI of 26.70 kg/m^2 in the overweight range. The median abdominal circumference was 83.35 cm in women, and 94.00 cm in men. Total cholesterol levels were 189.00 mg/dL and 198.00 mg/

dL for women and men, respectively; HDL cholesterol level was below 60.00 mg/dL in 79.90% of men and 78.20% of women, with median levels at 41.00 mg/dL and 49.00 mg/dL in men and women, respectively. Finally, the men's median triglyceride level was 144.00 mg/dL, whereas the women's was 105 mg/dL (Table 2).

After the 6-month health interventions, body weight, BMI and waist circumference, and the median levels of fasting glucose, total cholesterol, and HDL-cholesterol decreased significantly as compared to their respective baseline values ($p<0.05$) (Table 3). No significant change was found in the triglyceride level or systolic blood pressure. The median diastolic blood pressure, presented a statistically significant increase within the normal range; however, it was too small to be considered clinically significant. According to the American Heart Association, a clinically significant change in blood pressure has to be at least 3 or 8 mm Hg (Table 3).

When results were stratified by sex, significant reductions in body weight, BMI, waist circumference, and levels of fasting glucose and total cholesterol, and significant increases in diastolic blood pressure and HDL cholesterol level were found in the group of women. No significant changes in body fat percentage, systolic blood pressure, or triglyceride level were found in women. In men, significant reductions in body weight, BMI, percentage of body fat, waist circumference, and total cholesterol, and triglyceride were found, and no significant changes were observed in systolic and diastolic blood pressure, fasting glucose and HDL-cholesterol levels.

Compliance was a variable associated with better outcomes; data were stratified for changes in each study parameter by the type of interventions the participants had complied with. Forty two per cent of participants complied with the physical activity program by completing >80% of the recommended walking of 10,000 steps a day, 38% complied with the nutritional intervention by completing >80% of the recommended visits with a nutritionist, and the remaining 20% complied with both interventions. The self-reported healthy pause was reported as they included in their everyday activities.

As shown in Figure 1, the improvements in anthropometric, clinical, and biochemical markers tended to be greater in subjects

	N	%
Gender		
Female	381	53.4
Male	331	46.5
Education*		
High school diploma	17	4.2
Technical career	2	0.5
College degree	335	83.5
Post-graduate degree	47	11.7
Marital status**		
Married	167	41.5
Single	235	58.5
Offices		
Mexico City	394	55.3
Guadalajara	93	13.1
Monterrey	225	31.6
*331 missing data **310 missing data		

Table 1: Study population demographics

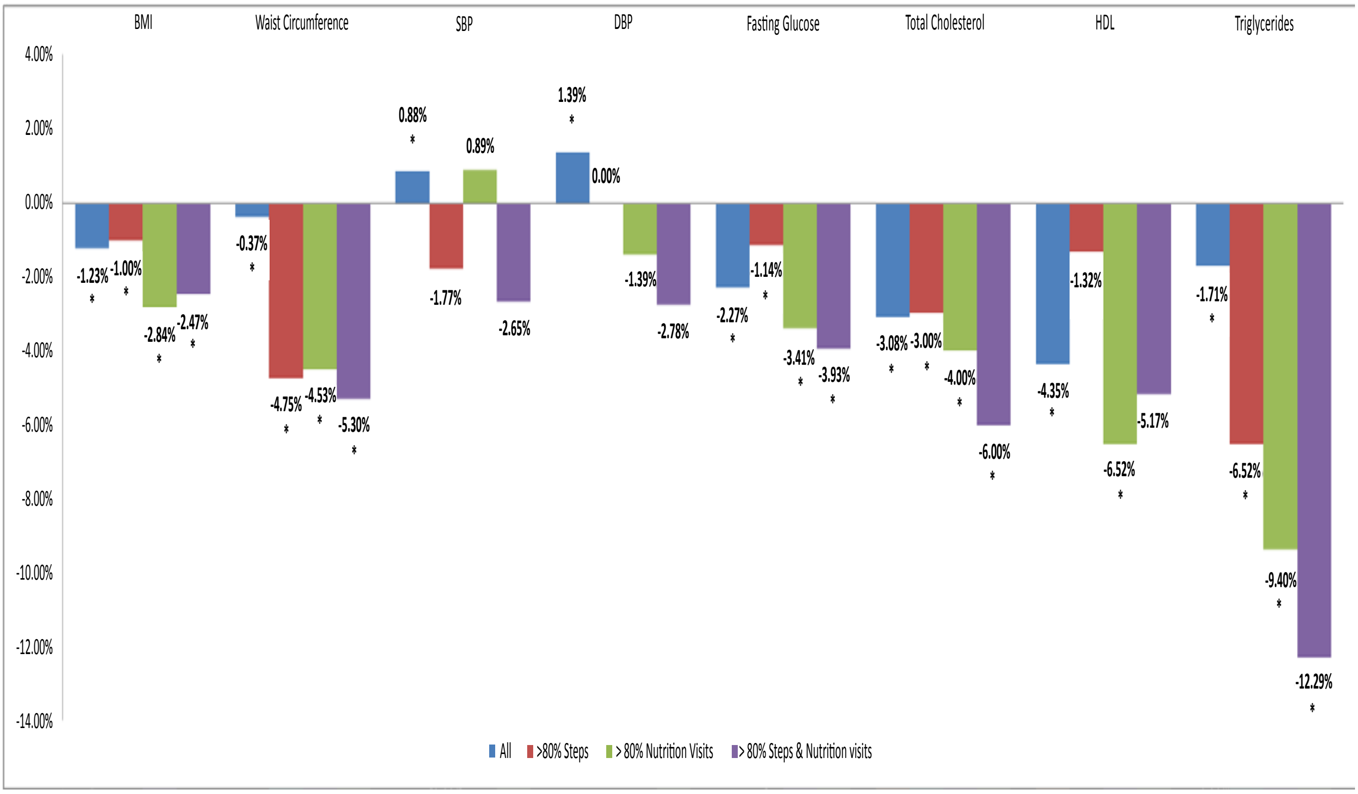
	All			Female			Male		
	n	Median	Percentile (25, 75)	*n*	Median	Percentile (25, 75)	*n*	Median	Percentile (25, 75)
Weight (kg)	712	69.7	(59.32, 82.60)	381	60.10	(54.90, 69.05)	331	81.00	(73.00, 88.90)
BMI (kg/m^2)	712	25.11	(22.50, 28.14)	381	23.60	(21.48, 26.33)	331	26.70	(24.50, 29.34)
Body Fat (%)	710	27	(22.80, 32.40)	381	30.80	(26.70, 35.05)	331	23.50	(20.30, 27.00)
Abdominal Circumference (cm)	401	88.4	(81.45, 96.0)	222	83.35	(77.50, 90.43)	180	94.00	(89.00, 99.85)
Waist Circumference (cm)	695	85.7	(76.50, 93.60)	381	77.5	(72.05, 86.00)	331	91.50	(85.70, 98.00)
Systolic Blood Pressure (mm Hg)	690	113	(104.0, 122.0)	381	109.00	(101.00, 117.00)	331	117.00	(109.00, 124.00)
Diastolic Blood Pressure (mm Hg)	690	72	(66.00, 79.00)	381	71.00	(65.00, 78.00)	331	73.00	(67.00, 80.00)
Fasting Glucose (mg/dL)	572	88	(82.50, 94.00)	381	86.00	(79.00, 92.00)	331	89.00	(82.00, 95.00)
Total Cholesterol (mg/dL)	571	195	(171.00, 217.00)	381	189.00	(166.00, 211.50)	331	198.00	(176.00, 222.00)
HDL Cholesterol (mg/dL)	530	46	(38.08, 53.00)	381	49.00	(44.00, 57.00)	331	41.00	(35.00, 46.00)
Triglycerides (mg/dL)	570	117	(89.00, 171.25)	381	105.00	(76.00, 139.50)	331	144.00	(106.00, 198.00)
Statistical test: Wilcoxon									

Table 2: Study population baseline characteristics.

	Baseline			Final			
	n	Median	Percentile (25, 75)	Median	Percentile (25, 75)	*p*	
Weight (kg)	712	69.7	(59.32, 82.60)	69.3	(58.95, 81.40)	*p<0.001	0.000
BMI (kg/m^2)	712	25.11	(22.5, 28.14)	24.8	(22.30, 27.75)	*p<0.001	0.000
Body Fat (%)	710	27	(22.80, 32.40)	26.9	(22.20, 32.33)	p>0.05	0.72
Abdominal Circumference (cm)	401	88.4	(81.45,96.0)	85	(78.00,93.00)	*p>0.001	0.000
Waist Circumference (cm)	695	85.7	(76.50, 93.60)	83.7	(74.30, 90.50)	*p<0.001	0.000
Systolic Blood Pressure (mm Hg)	690	113	(104.00, 122.0)	114	(105.00, 122.00)	*p>0.05	0.013
Diastolic Blood Pressure (mm Hg)	690	72	(66.00, 79.00)	73	(66.00, 81.00)	*p<0.005	0.005
Fasting Glucose (mg/dL)	572	88	(82.50, 94.00)	86	(80.00, 92.00)	*p<0.05	0.006
Total Cholesterol (mg/dL)	571	195	(171.00, 217.00)	189	(166.00, 217.00)	*p<0.001	0.000
HDL Cholesterol (mg/dL)	530	46	(38.08, 53.00)	44	(37.00, 53.63)	*p<0.005	0.005
Triglycerides (mg/dL)	570	117	(89.00, 171.25)	115	(84.75, 162.25)	*p>0.005	0.002

Statistical test: Wilcoxon

Table 3. Total population baseline and final intervention-related characteristics



*p>0.05

Figure 1: Median Percentage of the differences between baseline and final outcomes in anthropometric and clinical markers at the end of the intervention.

who complied with both interventions. Subjects who complied with the nutritional intervention and those who complied with both interventions showed similar reductions in BMI (2.84% and 2.47%, respectively). From the biochemical markers measured, changes in triglyceride levels were presented more often; they decreased 9.40% in the subjects who complied with nutritional intervention, and 12.29% in those who complied with both interventions. The interventions also markedly impacted the total cholesterol and HDL-cholesterol levels. Particularly, the subjects who complied with the nutritional intervention had a reduction of 4% and 6.52% in the total cholesterol and HDL-cholesterol levels, respectively. In the subjects who complied with both interventions, reductions in the total cholesterol and HDL-cholesterol levels were 6% and 5.17%, respectively (Figure 1).

Discussion

The present study assessed effects of the VS ADN program, one of the benefits provided by a company to promote a healthy lifestyle among its employees through nutritious diet, physical activity, and stress reduction. We observed a modest but significant improvement in the majority of the variables studied following the interventions, such as the median BMI, abdominal and waist circumferences, and median levels of fasting glucose, total cholesterol and triglycerides. This type of interventions that motivate the employees to adopt healthy habits in a workplace are essential to keep the workers healthy and, when the workers take the healthy habits to their families and communities, to make others connected with them healthy as well. The risk of hypertension, dyslipidemia, diabetes and other chronic diseases will drop as a result.

Although there have been similar studies published in the literature, they are difficult to compare since target populations are heterogeneous as per example populations with a high cardiovascular risk included in some studies [12]. Our population was healthy workers from the administrative staff invited to join the program to promote healthy habits, and before the baseline visits they were not aware of any health concern. Few studies have address corporate efforts to improve the health and productivity of economically active populations, and a healthy, qualified, and motivated workforce are essential for the success of an organization. [3,5,14,15]

After baseline, only overweight BMI, and elevated triglyceride levels were present, all other variables were within the normal ranges in the study subjects. To our knowledge, the present study is the first to investigate the effects of workplace lifestyle interventions in a generally healthy population in Mexico. According to the 2012 National Health and Nutrition Survey (ENSANUT), obesity and overweight rates in Mexican women were 37.5% and 35.9%, respectively, with a combined rate of 73%. In men, obesity and overweight rates were 26.8% and 42.5%, respectively, with a combined rate of 69% [16]. In our sample, the combined obesity and overweight rate of our study population, was 52.5%, and when stratified by gender the combined rates were 36.7% and 70.7% in the female and male participants, respectively. Thus, the obesity and overweight rate of the female participants was below its national counterpart, whereas that of the male participants was very similar to its corresponding national rate.

As we can see in the results of this study, implementing a health program within the workplace benefit their health at least in the short-term, as showed in the modest, but statistically significant, improvements in several indicators of health, including BMI, after a 6-month intervention. These small but significant changes are important since the study population was mainly of young adults, with a healthy status by clinical history and there are studies that report that population-wide small changes may have large risk-reduction effects in the long term [17]. Motivation for healthy styles of life within the workplace are relevant since unhealthy lifestyles, such as sedentarism, overweight and obesity status, smoking, low fruit and vegetable intake, are associated with decreased productivity at work [18] and poor quality of life [3,15].

Subjects complying with both, physical activity and nutritional interventions had better results in the majority of their anthropometric and biochemical markers (BMI, abdominal circumference, systolic and diastolic blood pressure, fasting glucose level, and total cholesterol and triglyceride levels). The group who only comply with the nutritional intervention presented just reductions in BMI. Our findings indicate that the combination of nutritional and physical activity interventions was more effective than the nutritional intervention alone. The additive effects of multimodal interventions with nutrition and physical activity have been reported in primary care, and have been highlighted by the Global Strategy on diet and Physical Activity and Health Program launched by the World Health Organization in 2004 however the information of multimodal programs including physical activity and diet in the working place are scarce.

A clinically and statistically significant decrease in total cholesterol was observed in the whole study population and in the separate male and female subpopulations. While HDL-C was significantly lower after the intervention in the whole group and in the group compliant with the nutritional intervention only, the group compliant with both physical activity and nutritional interventions only showed a non-significant trend toward a decrease in HDL-C. Studies assessing the impact of physical activity on HDL cholesterol are inconsistent, and the effects may differ between men and women [19]. In our study, there was no difference between the genders. In contrast to LDL-C, HDL-C has an inverse relationship with coronary heart disease. Thus, the lowering of the HDL-C levels following the interventions designed to improve health in our study was not an expected outcome. Positive outcomes in health parameters but the HDL-C level has occurred following health interventions. For example, the 6-month "Active" project, comprising individually supervised sessions 5 days per week, resulted in a reduction in systolic blood pressure by 1.8%, in weight by 1.3%, in fat percentage by 1.7%, and in the cholesterol level by 0.3%, without any change in the HDL-C level [20].

In the whole study population, there was a small (less than 1%) but significant increase in systolic and diastolic blood pressure. The change was smaller than those observed in other studies [8,21,22]. Unlike in our study, in previous studies, employees with a high risk of cardiovascular diseases were allowed to participate, which may have increased the effects of the intervention on these subjects; variations in blood pressure measurements, and the methods used to measure blood pressure, characteristics of the study subjects, such as age, sex, the amount of exercise, nutritional status, diet and use of medications, may all contribute to the differences in blood pressure changes [23]. For example, Rendón and Lurbe indicated that the normal measurement variability, when taking the transitional periods into account, is 1.8 mm Hg for systolic blood pressure and 1.2 mm Hg for diastolic blood pressure, which fall within the biologic variability between two days [24].

Lifestyle changes are important for the management of chronic diseases, such as metabolic syndrome. As we observed, the effectiveness of interventions is often dependent on the participants' compliance with the interventions prescribed by the program. Lifestyle changes must be permanent to influence the long-term health outcomes. Therefore, assessment of short- and long-term compliance is key to the success of a program [10]. Greater compliance with diet and physical activity recommendations leads to better health outcomes and, as Russell and Bartlett found, individualized guidance is associated with a greater health benefit [25]. According to the transtheoretical model of change by Prochaska and DiClemente, health behavior change occurs through 5 stages: pre-contemplation, contemplation, preparation, action, and maintenance. Reinforcement is important after the intention of change has been achieved. The role of nutritionists is particularly important, because they reinforce learned behaviors at each visit, helping the individuals maintain changes after the conclusion of the program [26]. Maintaining these new behaviors often requires support and reinforcement, either through the individuals' social network, or through a community-based program that supports changes in lifestyle [27] Low social support and involvement in higher leadership positions in a company are considered independent predictors of non-compliance with dietary and physical activity interventions. Therefore, providing individualized guidance [28] and creating an organizational culture that foster the practice of healthy behaviors inside and outside of a workplace is important for a successful lifestyle intervention in the workplace [29].

Although our results were positive and encouraging, there are some limitations inherent to the before and after design of the study, and to the voluntary enrollment of participants, some biased might be present, since the participants were probably more interested in healthy living than the general population, and therefore, more inclined to comply with the program interventions to gain the potential health benefits. Conducting a clinical trial should be the logical next step to better assess the success and compliance of these kinds of programs in corporations, and to establish recommendations for these companies. In published studies, clear differences exist in populations, inclusion and exclusion criteria, interventions and duration, making comparisons of the results between those studies difficult, and highlighting the need to establish guidelines for future studies to allow for effective comparisons of study results.

The significance of our study is that it provides a successful example that achieving improvement in health and adopting healthy lifestyles through workplace health interventions is an effective practice. Organizations and official entities can use this practice to address employees' health issues.

Conclusions

The VS ADN program has had a positive impact on the health of PepsiCo Mexico workers, demonstrating that the workplace offers a great setting to promote a healthy lifestyle through adequate diet and exercise and personal guidance from visits with a nutritionist. We found that the health benefits are greater in those who are compliant with all components of the program. Strategies to increase compliance, such as continuous reinforcement, should be emphasized when implementing a workplace lifestyle intervention. Controlled clinical trials will help further validate the health benefits of the program. Providing free health programs as a form of compensation or an additional benefit for workers at a company might decreases the probability of dropouts and increases morale and productivity.

Competing Interest

This project was funded by PepsiCo, Inc. AR, JG, MA, and YC are employees of PepsiCo, Inc. The views expressed in this manuscript are those of the authors and do not necessarily reflect the position or policy of PepsiCo, Inc.

Author Contributions

The study was designed by AR with review and input from JG, MA. JG was responsible for the overall supervision of the study. MA was one of the nutritionists.

AR was responsible for the interpretation of the results and manuscript writing with assistance from PC.

JG was responsible for statistical analysis with advice and supervision of JT.

YC, MO reviewed and edited manuscript drafts and the final manuscript.

AR wrote this paper as a pre-work of her PhD in Clinical Epidemiology, advised by PC, and will be publish the results of a Clinical study done as a follow up of this publication.

All authors read and approved the final manuscript.

Acknowledgment

We would like to acknowledge PepsiCo International Mexico, who sponsored the complete study and supported the implementation and annual application of the Vive Saludable ADN program.

References

1. World Health Organization (2004). The Global Burden of Disease 2004 update.
2. Sistema Nacional de Información en Salud
3. Emmons KM, Linnan LA, Shadel WG, Marcus B, Abrams DB (1991) The working healthy Project: A worksite health promotion trial targeting physical activity, diet and smoking. Journal of Occupational & Environmental Medicine 41: 545- 555.
4. Muto T, Hashimoto M, Haruyama Y (2006) Evaluation of a workplace health promotion program to improve cardiovascular disease risk factors in sales representatives. International Congress Series. 1294: 131- 134.
5. European Network for Workplace Health Promotion (2007). Luxemburg Declaration on Workplace Health Promotion in European Union.
6. World Health Organization (2014) Workplace Health Promotion.
7. World Health Organization (2003) Occupational Health topics.
8. Muto T, Yamauchi K (2001) Evaluation of a multicomponent Workplace Health promotion program, conducted in Japan for improving employees´ cardiovascular disease risk factors. Preventive Medicine. 33: 571- 577.
9. European Network for Workplace Health Promotion (2012) Healthy Lifestyles-Healthy living and working.
10. Fappa E, Yannakoulia M, Pitsavos C, Skoumas I, Valourdou S, et al. (2008) Lifestyle intervention in the management of metabolic syndrome: could we improve adherence issues? Nutrition 24: 286-291.
11. Sofi F, Gori AM, Marcucci R (2007) Adherence to a healthful life attenuates lipid parameters among a healthy Italian population. Nutrition, Metabolism & Cardiovascular Diseases. 17: 642-648.
12. Li Y, Yatsuya H, Iso H, Tamakoshi K, Toyoshima H (2010) Incidence of metabolic syndrome according to combinations of lifestyle factors among middle-aged Japanese male workers. Prev Med 51: 118-122.
13. Loef M, Walach H (2012) The combined effects of healthy lifestyle behaviors on all cause mortality: a systematic review and meta-analysis. Prev Med 55: 163-170.
14. Naito M, Nakayama T, Okamura T (2008) HIPOP-OHP Research Group. Effect of a 4-year workplace-based physical activity intervention program on the blood lipid profiles of participating employees: the high-risk and population strategy for occupational health promotion. Atherosclerosis. 197: 784-790.
15. World Health Organization (2012). Task force 6: Health Promotion Activity.
16. Gutiérrez JP, Rivera, Instituto Nacional de Salud Pública (2012). Encuesta Nacional de Salud y Nutrición 2012.
17. Rose G (1985) Sick individuals and sick population. International Journal of Epidemiology. 14: 32-38.
18. Robroek SJ, van den Berg TI, Plat JF, Burdorf A (2011) The role of obesity and lifestyle behaviours in a productive workforce. Occup Environ Med 68: 134-139.
19. Brownell KD, Bachorik PS, Ayerle RS (1982) Changes in plasma lipid and lipoprotein levels in men and women after a program of moderate exercise. Circulation 65: 477-484.
20. Dunn AL, Marcus BH, Kampert JB, Garcia ME, Kohl HW 3rd, et al. (1997) Reduction in cardiovascular disease risk factors: 6-month results from Project Active. Prev Med 26: 883-892.
21. Isaacs AJ, Critchley JA, Tai SS, Buckingham K, Westley D, Harridge SDR, et al. (2007) Exercise Evaluation Randomized Trial (EXERT): a randomized trial comparing GP referral for leisure center-based exercise, community-based walking and advice only. Health technology assessment 11: 1-165.
22. Thorndike AN, Healey E, Sonnenberg L, Regan S (2011) Participation and cardiovascular risk reduction in a voluntary worksite nutrition and physical activity program. Prev Med 52: 164-166.
23. Terrés-Speziale AM (2006) Estimación de la incertidumbre y de la variabilidad total en el laboratorio clínico. Revista Mexicana de Patología Clínica. 53: 185-196.
24. Redón J, Lurbe E (2002) [Ambulatory monitoring of blood pressure during 24, 48, 72 hours. Which is the reasonable limit?]. Med Clin (Barc) 118: 543-544.
25. Koenigsberg MR, Bartlett D, Cramer JS (2004) Facilitating treatment adherence with lifestyle changes in diabetes. Am Fam Physician 69: 309-316.
26. Reusch A, Ströbl V, Ellgring H, Hermann Faller (2011) Effectiveness of small-group interactive education vs. lecture-based information-only programs on motivation to change and lifestyle behaviors. A prospective controlled trial of rehabilitation inpatients. Patient Education and Counseling. 82:186-192.
27. Elford RW, Yeo M, Jennett PA, Sawa RJ (1994) A practical approach to lifestyle change counselling in primary care. Patient Educ Couns 24: 175-183.
28. Aggarwal B, Liao M, Allegrante JP, Mosca L (2010) Low social support level is associated with non-adherence to diet at 1 year in the Family Intervention Trial for Heart Health (FIT Heart). J Nutr Educ Behav 42: 380-388.
29. Hopkins J, Glenn B (2012) Implementing organizational physical activity and healthy eating strategies on paid time: process evaluation of the UCLA WORKING pilot study; Oxford Journals. Health Education Research. 27 : 385-398.

Citation: Rullán A, García J, Alvarez M, Talavera JO, Chu YF, et al. (2014) Effects of a Comprehensive Health and Wellness Program on Administrative Employees of a Corporation in Mexico. J Community Med Health Educ 4: 303. doi:10.4172/2161-0711.1000303