III Encontro Luso-Galaico de Biometría
Aveiro, 28 - 30 June 2018

EFFECTS OF A HEALTH EDUCATION INTERVENTION ON PHYSICAL ACTIVITY IN INDIVIDUALS WITH MODERATE-TO-HIGH CARDIOVASCULAR RISK

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ABSTRACT

This study evaluated the effects of a health education and counseling intervention program, in a primary healthcare setting, on daily physical activity (PA) in individuals with moderate-to-high risk of cardiovascular disease. This was a parallel-group study with a 4-month-long intervention, plus 8 months of follow-up. Participants were 164 individuals with moderate-to-high cardiovascular risk, allocated to either an intervention (IC, n=87) or a control group (CG, n=77). The intervention consisted by 3 walking and face-to-face group sessions plus text messages. The primary outcome was daily PA measured by sedentary time, light and moderate-to-vigorous PA. After the intervention (4 months) and follow-up (8 months) periods, the results show significant differences between Groups (IC, CG) for sedentary time and light PA, but not for moderate-to-vigorous PA. No significant changes were found for the variable Time (baseline, 4 months, 8 months) and for the correspondent interaction between Groups and Time, even after adjustments for age, gender, BMI, and variables that were different between groups at baseline. The health education and counseling program did not improve daily PA of participants with moderate-to-high cardiovascular risk.

Keywords and key sentences: education, counseling, primary care, cardiovascular risk, daily physical activity, linear mixed models regression

1. INTRODUCTION

Physical activity (PA) confers health benefits, with evidence indicating that any amount of PA is healthful. The increment of daily PA levels is recommended in primary and secondary prevention of cardiovascular disease (CVD). Despite the recommendations, 31.1% of the adults worldwide fail to meet the PA guidelines.[1]

Given that the incidence of CVD remains high, the early detection of patients at risk is an important strategy to prevent the onset of CVD. In developed countries, 70-80% of adults visit their general practitioner at least once a year, which makes the primary care health services the best setting to assess cardiovascular risk, manage risk factors, and promote a healthy lifestyle, including the promotion of PA. The aim of this study was to evaluate the effects of a 4-month health education and counseling intervention in primary care, and an 8-month follow-up period, on daily PA in adults with moderate to high cardiovascular risk.

2. METHODS

This study was a parallel-group with a non-probabilistic sample conduced from March 2012 to July 2013 at the primary health care center. The study consisted of a health education and counseling intervention aiming to promote the increase in daily PA levels. Participants were selected from the registries of a primary health care center. Allocation to the intervention group (IG) was made by convenience according to the will and availability to participate in educational and counseling group sessions and to receive text messages on their mobile phones. Those who agreed to participate in the evaluations but were not available to participate in the health education and counseling IG were allocated to the control group (CG). The study was approved by the Ethics Committee of the North Regional Health Authority (I.P. 25/2010) and all procedures were conducted according to the Helsinki declaration.

Daily PA was assessed using accelerometers (Actigraph GT1M, Actigraph LLC, Pensacola, FL) over the right hip, for 7 consecutive days, during the waking hours, except while bathing and water-based activities. The average minutes/day spent at different categories of PA intensity was determined according to cut points that relate PA to counts/min: sedentary time (≤ 99 counts/min), light PA (100 - 2019 counts/min) and moderate-to-vigorous MVPA (MVPA) (≥ 2020 counts/min). Total cardiovascular risk was calculated according to the 2013 ESH/ESC International Guidelines for the Management of Hypertension.[2]

The intervention consisted of three group sessions, followed by mobile text messages to encourage and reinforce PA adherence. Two general practitioners and a PA specialist delivered the health educational and counseling program, which was consisted of three sessions, lasting approximately 90 minutes each. A maximum of 10 participants were included in each session group. Sessions were composed of a 30-minute group walk at moderate intensity in the city park, followed by 60 minutes of face-to-face intervention. In the first 60-minute session, a general practitioner presented information about the CVD risk concept, how to identify personal risk factors that influence the CVD risk, and insights about the impact of a moderate and high CVD risk on health status and quality of life. A general practitioner conducted the second session and the content was targeted at healthy behaviors and lifestyle (i.e., diet; tobacco cessation; salt intake; adherence and compliance with medication; stress management; and PA) as a path to diminish CVD risk. The third session was conduced by a PA specialist, the participants received a booklet with all the information presented during the sessions and a PA plans for each week of the four-month period. After the sessions, participants in the IG received 12 mobile text messages to encourage and reinforce PA adherence. The texts messages were

delivered once a week during the first two months, and twice a month in the last 2 months. During the follow-up IG and CG only received the usual care. The intervention program followed the recommendations and standards of the American College of Sports Medicine.[3]

An intention-to-treat analysis was conducted, with the inclusion of all participants assessed and allocated into groups at baseline. Changes in groups (IC; CG), time (baseline, 4 months; 8 months), and groups over time (group*time interaction) were modeled using a linear mixed-model regression with random-effects. The covariance type used for the random-effects was the unstructured option (completely general covariance matrix). Other covariance types (e.g. first order autoregressive) were also used but presented less accurate results (higher Akaike's Information Criterion values). Normality of residuals was verified by visually inspection. Statistical analysis was performed using IBM SPSS software version 21 (SPSS, Chicago, USA) and vales of *P* less than 0.05 were considered significant.

3. RESULTS

The study included 85 participants in the IG (57.16 ± 6.61 years old; males 45.9%) and 77 in the CG (55.42 ± 7.34 years old; males 44.2%) with moderate-to-high CVD risk. Considering daily PA, the IG showed significantly higher sedentary time (p=0.040) and lower light PA (p=0.004) than the CG (Table 1). Also, de body mass index (BMI) has a slightly decrease throughout time (p=0.038) for the IC group.

		Baseline (T1)		4 months (T2)		Follow up (T3)	
		n	**Mean ± sd**	**n**	**Mean ± sd**	**n**	**Mean ± sd**
Body mass index, kg/m^2	IG	85	29.27 (3.91)	76	28.87 (3.91)	56	28.92 (3.79)
	CG	77	29.89 (4.32)	65	30.19 (4.08)	42	28.96 (3.64)
Sedentary time, min/day*	IG	82	472.2 (85.6)	71	452.2 (89.3)	54	454.4 (102.2)
	CG	74	435.4 (100.2)	63	426.2 (109.2)	37	441.3 (101.8)
Light PA, min/day*	IG	82	289.8 (92.4)	71	299.1 (94.4)	54	294.4 (92.5)
	CG	74	337.0 (103.7)	63	331.2 (102.1)	37	320.1 (86.1)
MVPA, min/day	IG	82	32.9 (25.8)	71	41.0 (29.9)	54	34.3 (27.4)
	CG	74	38.3 (31.4)	63	41.0 (30.5)	37	42.5 (39.3)

Table 1. Parameters at baseline, 4 months and 8 months (follow-up) for an intention-to-treat analysis. *Groups were significantly different at baseline p < 0.05

	Factors	**Unadjusted model**	**Adjusted model**
Sedentary time, min/day	Group	41.4 (17.9); p=0.021	42.4 (18.2); p=0.021
	Group * Time	-5.99 (7.6); p=0.433	-7.4 (7.6); p=0.331
Light PA, min/day	Group	-50.0 (18.9); p=0.009	-50.5(19.0); p=0.009
	Group * Time	4.7 (6.5); p=0.468	4.4 (6.4); p=0.491
MVPA, min/day	Group	-2.8 (5.9); p=0.640	-2.7 (5.9); p=0.651
	Group * Time	-0.4 (2.5); p=0.878	0.1 (2.6); p=0.938

Table 2. Linear mixed model regression for sedentary time, light and moderate-to-vigorous physical activity. Values presented are in Slope(SE). The factor time was always non-significant. Adjusted model: age, gender, body mass index, dyslipidemia, antihypertensive and antidepressants/ anxiolytic medication.

After the intervention (4 months) and follow-up (8 months) periods, the results show significant differences between Groups (IC versus CG) for sedentary time and light PA, but not for moderate-to-vigorous PA (Table 2). No significant changes were found for the variable Time (baseline, 4 months, 8 months) and for the correspondent interaction between Groups and Time (Table 2, unadjusted models). After adjustments for age, gender, BMI, and variables that were different between groups at baseline, the results remained similar (Table 2, adjusted models).

4. CONCLUSIONS

In conclusion, this study did not provide evidence for the efficacy of a health education and counseling program in a primary care setting to improve daily PA levels in individuals with moderate to high cardiovascular risk. This study used an objective measurement for PA, which likely improved the accuracy of assessments over time. Indeed, the use of self-report measures of PA is the most common method in previously published trials, which might inflate estimates of interventions effects, once respondents tend to report less sedentary behaviors and more MVPA.[4]

Several limitations of this study should be noted. First, the allocation of patients into groups was made by convenience. Second, this study did not assess self-regulation for PA and compared this between the groups. Given that allocation was made by convenience, it is possible that those included in the IG were those who were more conscious of and motivated bout the importance of lifestyle changes. Third, the sample size, and the participant's retention at one year, was small.

ACKNOWLEDGMENT

The European Regional Development Fund through the Operational Competitiveness Program, and the Foundation for Science and Technology (FCT) of Portugal support this study and the research unit CIAFEL within the projects FCOMP-01-0124-FEDER-020180 (References FCT: PTDC/DES/122763/2010,UID/DTP/00617/2013,UID/BIM/04501/2013,UID/MAT/04106/2013). The FCT supported the author Lucimére Bohn (SFRH/BD/78620/2011).

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