ORIGINAL ARTICLE

The impact of motivational interventions for increasing physical activity

Impacto da intervenção motivacional no aumento do nível de atividade física

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ABSTRACT

Objective: To assess whether incentives for practicing regular physical activities in fact help raising the frequency of exercising. **Methods:** Male and female subjects undergoing two to three assessments in the Check-Up Unit of Hospital Israelita Albert Einstein (HIAE) were evaluated by noting any increase in levels of physical activity, improvements in mean metabolic unit numbers, and the sensitization index. The International Physical Activity Questionnaire was applied to assess the sample. **Results:** There were 1,879 subjects – 1,559 (83%) males and 320 (17%) females – aged 20 to 76 years (mean age = 45.8 years, standard deviation ± 8.8) who underwent a Continued Health Review at the Center for Preventive Medicine of the HIAE, Check-Up Unit, Jardins. Initially, over half of the sample was insufficiently active (sedentary or poorly active); there were more women than men in this group. After the health review, most subjects increased their level of physical activity; this increase was higher among women. Males encouraged three times to exercising showed better results (increased level of physical activity) as compared to males encouraged twice for exercising. The best results in females were found in the group that went through two evaluations. This result is due to the fact that the sample of females comprising the group that received incentives on three occasions was small. This was also the only group that showed no increase in mean metabolic units. The sensitization index assessment in the overall sample was very satisfactory, as the expected results were achieved. **Conclusions:** These results show that motivational interventions are effective for raising the level of physical activity. We concluded that to encourage the practice of regular physical activity through information programs about its health benefits is very important.

Keywords: Intervention studies; Motor activity; Exercise movement techniques; Exercise; Metabolic equivalent; Energy metabolism; Preventive medicine/methods; Health promotion; Motivation; Quality of life; Questionnaires; International Cooperation

RESUMO

Objetivo: Verificar se a proposta de incentivo à prática regular de atividade física colabora para o aumento dos níveis de atividade física. **Métodos:** Foi realizada uma avaliação entre os grupos de homens e mulheres que passaram por duas ou três avaliações na Unidade de Check-Up do Hospital Israelita Albert Einstein (HIAE), comparando-se a melhora no nível de atividade física, a melhora da média do número de unidades metabólicas e o Índice de Sensibilização. Toda a amostra foi avaliada por meio do Questionário Internacional de Atividade Física. **Resultados:** A amostra foi constituída por 1.879 indivíduos, sendo 1.559 (83%) do sexo masculino e 320 (17%) do sexo feminino, com idades variando de 20 a 76 anos, idade média de 45,8 anos (desvio padrão ± 8,8) submetidos à Revisão Continuada de Saúde no Centro de Medicina Preventiva do HIAE, Unidade Check-Up, Jardins. No início do nosso estudo, mais da metade da nossa amostra era de indivíduos insuficientemente ativos (sedentários + pouco ativos), sendo que, quando dividida a amostra entre os gêneros, este número foi maior entre as mulheres. Após a reavaliação, foi possível constatar que grande parte dos indivíduos obteve aumento no nível de atividade física, sendo que entre as mulheres este aumento foi maior. O grupo de homens que recebeu a proposta de incentivo à atividade física por três vezes obteve melhores resultados em relação aos níveis de atividade física que o grupo de homens que recebeu a proposta de incentivo por duas vezes. No grupo das mulheres, o resultado foi melhor no grupo avaliado duas vezes. Este resultado se deve ao número reduzido da amostra de mulheres do grupo que recebeu a proposta por três vezes. Este grupo também foi o único que não apresentou aumento do número da média de unidades metabólicas. A avaliação do Índice de Sensibilização na amostra geral foi muito satisfatória, atingindo os resultados esperados. **Conclusões:** Estes resultados demonstram que a Intervenção Motivacional é uma ferramenta eficaz para a promoção da atividade física. Conclui-se que é de grande importância o incentivo da prática regular de atividade física mediante programas de informação de seus benefícios à saúde.

Descritores: Estudos de intervenção; Atividade motora; Técnicas de exercício e de movimento; Exercício; Equivalente metabólico; Metabolismo energético; Medicina preventiva/métodos; Promoção da saúde; Motivação; Qualidade de vida; Questionários; Cooperação Internacional

Study carried out at Centro de Medicina Preventiva of Hospital Israelita Albert Einstein – HIAE – Unidade Check-UP, Jardins, São Paulo (SP), Brazil.

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INTRODUCTION

Recent studies relating physical activity and health have shown that lifestyle is one of the main health indicators of the population[1]. Nahas defines it as "the set of habitual actions that reflects the attitudes, values, and opportunities in the live of people"[2]. Evidence in the past two decades showed that a healthy lifestyle, including regular physical activity, helps prevent and control chronic diseases, such as cardiovascular conditions, arterial hypertension, obesity, diabetes, osteoporosis, anxiety, and depression[1,3-9]. Physical activity improves health; however, a significant segment of the population remains physically inactive[8-11]. Worldwide, over 2 million deaths are attributed to physical inactivity every year[12-14].

Surveys on sedentarism in the United States, from 1997 to 1998, revealed that about four in ten adults (38.3%) did not exercise during leisure time[6]. These numbers define physical inactivity as one of the most relevant Public Health issues in that country[15].

Because of these studies, assessments of physical activity levels in populations were shown to be important for preventing such health risks by fostering regular exercising[16-21]. Several questionnaire-based surveys were carried out to establish the level of physical activity[17]. Current propositions suggest including the International Physical Activity Questionnaire (IPAQ), developed by the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC)[14,17, 22-23].

The CDC and the American College of Sports Medicine presented a new message for fostering physical activity, with the main aim of encouraging subjects to become less sedentary and to acquire a new status that includes at least minimal physical activity, which already provides cardiovascular benefits: "Every subject should carry out at least 30 minutes of moderate, continual or fractionated physical activity during most days of the week[24-27]. Many studies on motivational interventions and change in behavioral stages relative to physical activity have been undertaken in recent years[28-29]. There is a significant potential in the proposition of incentives for physical activity[10]. Best results appear six weeks following interventions, when all subjects, regardless of their initial behavioral stage, become significantly more active[8,30]. Other studies, however, showed that such effects are not maintained eight weeks after interventions, suggesting that more intensive and longer lasting incentives may be needed for subjects to adopt physical activities permanently[8,31-33]. Evidence in the literature demonstrates that health and physical activity-related interventions face more resistance from adults, whose behaviors are less easy to change[34].

OBJECTIVE

The purpose of this study was to verify whether the proposition of incentives for regular physical exercise based on motivational interventions helps raising the level of physical activity.

METHODS

Sample

There were 1,879 subjects, 1,559 males (83%) and 320 females (17%), all in good health conditions, from the Social Group A, selected during the Continued Health Review at the Jardins Check-Up Unit of the Preventive Medicine Center, Hospital Israelita Albert Einstein.

This group was composed mostly of executives. The Continued Health Review consists of a clinical interview, laboratory exams, a treadmill stress test, imaging exams, and consultations with gynecologist, urologist, nutritionist and physical therapist.

Upon admission, subjects were given the necessary information for care, which involved:

- consent for procedures, including a signing an informed consent form for this study;
- patient rights and duties;
- general information about procedures, care, risk and alternative procedures.

Instruments

The International Physical Activity Questionnaire (IPAQ) was developed in 1996, by Dr. Michael Booth, from Sidney, Australia. A study was carried out in 2000, involving 12 countries (including Brazil), with the objective of establishing the validity and reliability of this instrument[16,20]. Results showed that the IPAQ provides good stability of measures and acceptable accuracy for use in population studies with young and middle-aged adults[35-36]. The IPAQ has the following advantages: it comes in two versions (short and long) [36], energy expenditure may be estimated, there is a classification of subjects (sedentary, poorly active, active, very active), possibility of comparisons and adaptation to our context[16,20].

The short IPAQ version was applied as an interview, referring to the previous week of individual activity. The IPAQ contains questions about frequency, duration, and intensity of physical activity, which may be classified as mild, moderate or vigorous. Mild activities have an energy expenditure of 3.3 metabolic units or MET (where 1 MET: 3.5 ml/kg/min); moderate activities have an energy expenditure of 4.0 MET, and vigorous activities have an energy expenditure of 8.0 MET[37].

Subjects were divided into four groups, as follows: sedentary, poorly active, active, and very active.

On the first physical therapy evaluation, subjects received motivational orientation with regard to the regular practice of physical activities; the messages of the CDC and the American College of Sports Medicine were presented: "Every individual should practice at least 30 minutes of moderate, continued or fractionated physical activity on most days of the week"[24,26,37]. In other physical therapy evaluations, individuals were given the same orientations, and comparisons were made with previous evaluations to establish the level of sensitization of these individuals to the recommendation of the CDC and the American College of Sports Medicine, as a motivational intervention.

Motivational intervention (MI) is a relatively new cognitive-behavioral technique that aims to help patients to identify and change behaviors that might increase their risk of developing disease, and to help them prevent the complications of chronic diseases. MI is based on the Transtheoretical Model of the theory developed by Prochaska and Marcus, also known as Behavioral Stages of Change (BSC)[28,38]. Table 1 shows the stages of behavioral change and their features.

Table 1. Behavioral stages of change and their characteristics

Stages	Characteristics
Precontemplation	The individual does not intend to change his/her behavior in the next six months
Contemplation	The individual seriously intends to change behavior in the next six months
Determination	The individual intends to act in a near future (generally in the next month)
Action	Behavior has been incorporated for at least six months
Maintenance	Action has taken place for at least six months and the chance of relapsing to previous behavior are minimal

Source: Adapted from Prochaska and Marcus[38].

Although primarily psychological, this model recognizes that specific factors in the change process, such as the perception of benefits (pro) and barriers (against), include social and environmental factors in its analysis.

Taking into account the cognitive and behavioral processes together with internal and environmental factors when adopting a new health-related behavior may explain why this model has gained importance in health, particularly in physical activity issues. Another advantage of this model is that, by providing a classification of subjects, the most appropriate intervention for each behavior may be indicated[28,38].

Data collection

Subjects were evaluated from April 2005 to February 2009 by using the IPAQ. The same two researchers applied the questionnaire all the times.

Classification criteria

Intensity of physical activity

Activity classification analysis as mild, moderate and vigorous was done according to the IPAQ criteria, in which 'low' is the lowest level of physical activity, and the individuals who not meet criteria for categories 2 or 3 are considered inactive.

Moderate is the physical activity carried out according to any one of the following criteria:

- three or more days of vigorous activity of at least 20 minutes per day;
- fice or more days of moderate-intensity activity or walking of at least 30 minutes per day;
- five or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-minutes/week.

Vigorous physical activities are those carried out according to any one of the following criteria:

- vigorous-intensity activity on at least three days and accumulating at least 1,500 MET-minutes/week;
- seven or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of 3,000 MET-minutes/week.

Level of physical activity – IPAQ

The Centro de Estudos do Laboratório de Aptidão Física de São Caetano do Sul (CELAFISCS) and the CDC Atlanta 2002 consensus were applied to analyze the level of physical activity according to the IPAQ data, which takes into account frequency and duration criteria to classify individuals into categories.

Very active: individuals meeting the following recommendations:

- vigorous activity: ≥ 5 days/week and ≥ 30 minutes per session and/or;
- vigorous activity: ≥ 3 days/week and ≥ 20 minutes per session + moderate and/or;
- walking: ≥ 5 days/week and ≥ 30 minutes per session.

Active: individuals meeting the following recommendations:

- vigorous activity: ≥ 3 days/week and ≥ 20 minutes per session and/or;
- moderate activity or walking: ≥ 5 days/week and ≥ 30 minutes per session and/or;
- any activity added: ≥ 5 days/week and ≥ 150 minutes/week (walking + moderate + vigorous).

Poorly active: individuals practicing physical activities but not sufficiently to be characterized as active, since frequency and duration recommendations are not met. For this evaluation, the frequency and duration of different exercises are summed (walking

+ moderate + vigorous). This group was divided into two subgroups according to the following or not of recommendations:

Poorly active:

- **Poorly active A**: individuals meeting at least one of the activity frequency or duration recommendations: frequency of 5 days/week or duration of 150 minutes/week.
- **Poorly active B**: individuals that do not meet any of the recommended frequency or duration criteria.

Sedentary: individuals not undertaking any physical activity for at least ten continuous minutes during the week[17].

We did not subdivide the poorly active group in the IPAQ classification for this analysis.

Level of physical activity – number of MET

The following classification was used for analyzing the level of physical activity according to the MET number:

1. Sedentary: 0 to 150 MET;
2. Poorly active: 151 to 630 MET;
3. Active: 631 to 3,149 MET;
4. Very active: over 3,150 MET[35].

Individuals sensitized to motivational interventions were considered as those that migrated from a sedentary status to at least the poorly active group, those that remained poorly active and/or became active or very active, and those that remained active or very active.

Sensitization index

The sensitization index represents the increased number of individuals (or their percentage) that meet the active or very active recommendations.

Data analysis

A table with over 10,000 visits was analyzed, from which individuals that had been evaluated two or three times were included in this study. Individuals evaluated only once or four times were excluded, due to lack of sample size.

Thus, male and female individuals that visited the Check-Up Unit two or three times were evaluated to compare improvements in the level of physical activity (NAF), in the mean number of metabolic units (MET), and the sensitization index (IS).

This study was approved by Albert Einstein research and Ethies Committe nº 09/1191.

RESULTS

Table 2 shows the characteristics of the participants in this study.

Table 2. Sample characteristics

Population	Males	Females	Total
n (%)	1,559 (83.0%)	320 (17.0%)	1,879
Age	46.3 ± 8.8	43.4 ± 8.4	45.8 ± 8.8

Table 3 shows the distribution of individuals that participated in this study according to the levels of physical activity and the classification of insufficiently active individuals that met the recommended physical activity level.

Table 3. Distribution of the sample per physical activity levels: general sample

Characteristics	Males (%)	Females (%)	Total (%)
Sedentary	15.06	4.20	19.27
Poorly active	30.76	6.33	37.09
Active	29.75	4.74	34.49
Very active	7.40	1.76	9.15
Insufficiently active (sedentary + poorly active)	45.82	10.54	56.36
Achieve recommendation (active + very active)	37.15	6.49	43.64

We found, initially, that most of our sample was insufficiently active (56.4%).

Table 4 shows the distribution of the sample between groups of physical activity in terms of gender and the changes after the motivational intervention.

Table 4. Distribution of the sample per physical activity level among males and females

Characteristics	Males		Females	
	Baseline (%)	After MI (%)	Baseline (%)	After MI (%)
Sedentary	21.6	19.8	27.3	23.5
Poorly active	44.1	41.3	41.2	34.9
Active	42.6	47.4	30.8	40.5
Very active	10.6	10.5	11.4	11.8
Insufficiently active	65.7	61.1	68.5	58.5
Achieve recommendation	53.2	57.8	42.2	52.2

MI: motivational intervention

Our analysis according to gender revealed that there were more insufficiently active individuals among women. Figures 1 and 2 show the variation in levels of physical activity after the motivational intervention in the two and three evaluation groups for males and females.

In our sample, no increase in the level of physical activity was found only in the groups of female individuals that were evaluated three times.

The mean variation of MET numbers between males and females after the motivational intervention may be seen on Figure 3.

Again, only the group of female individuals evaluated three times did not improve after the motivational intervention.

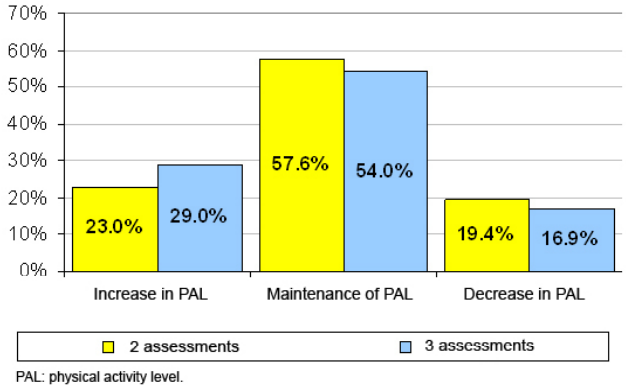

Figure 1. Result of motivational intervention in males

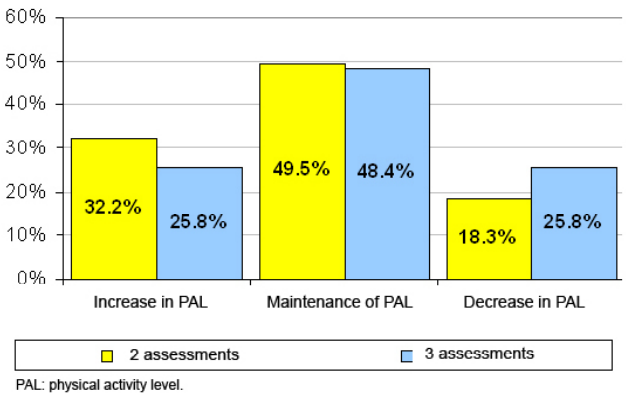

Figure 2. Result of motivational intervention in females

The number of insufficiently active individuals (sedentary and poorly active) decreased considerably after the motivational intervention. Table 5 shows the number of individuals that reached the currently recommended health-promoting level of physical activity. We applied the sensitization index to assess the increase in this group.

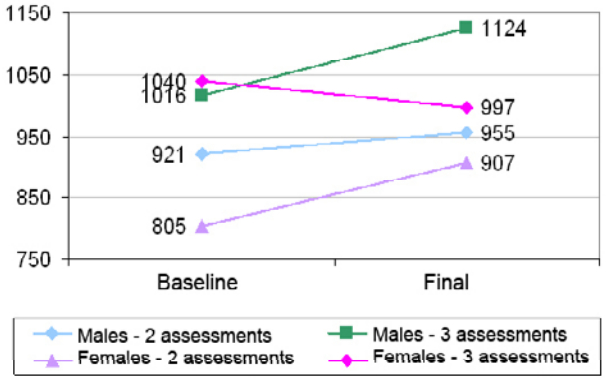

Figure 3. Result of motivational intervention in mean number of METs in each group

DISCUSSION

The proposition of encouraging physical activity in the form of a motivational intervention was very positive in both male and female groups.

At the beginning of our study, over half of our sample was insufficiently active (sedentary + poorly active), especially among women. A Datafolha survey (1997) showed that most of their study population mentioned lack of time as the main reason for not exercising regularly[21]; this was also the explanation given among our group, which consisted mostly of business executives.

Table 5. Distribution of individuals per physical activity level before and after the motivational intervention

Population		Sedentary	Little active	Active	Very active	Insufficiently active	Achieve recommendation	Sensitization rate (%)	
		n (%)	n (%)	n (%)	n (%)	n (%)	n (%)		
Males 2 assessments	Before	253 (13.46)	487 (25.92)	459 (24.43)	112 (5.96)	740 (39.38)	571 (30.39)		
	After	236 (12.56)	466 (24.8)	501 (26.66)	108 (5.75)	702 (37.36)	609 (32.41)	38	6.7
Males 3 assessments	Before	30 (1.6)	91 (4.84)	100 (5.32)	27 (1.44)	121 (6.44)	127 (6.76)		
	After	23 (1.22)	76 (4.04)	120 (6.39)	29 (1.54)	99 (5.27)	149 (7.93)	22	17.3
Females 2 assessments	Before	73 (3.89)	110 (5.85)	77 (4.1)	29 (1.54)	183 (9.74)	106 (5.64)		
	After	61 (3.25)	92 (4.9)	105 (5.59)	31 (1.65)	153 (8.14)	136 (7.24)	30	28.3
Females 3 assessments	Before	6 (0.32)	9 (0.48)	12 (0.64)	4 (0.21)	15 (0.8)	16 (0.85)		
	After	7 (0.37)	9 (0.48)	12 (0.64)	3 (0.16)	16 (0.85)	15 (0.8)	-1	-6.3
Males	Before	283 (15.06)	578 (30.76)	559 (29.75)	139 (7.4)	861 (45.82)	698 (37.15)		
	After	259 (13.78)	542 (28.85)	621 (33.05)	137 (7.29)	801 (42.63)	758 (40.34)	60	8.6
Females	Before	79 (4.2)	119 (6.33)	89 (4.74)	33 (1.76)	198 (10.54)	122 (6.49)		
	After	68 (3.62)	101 (5.38)	117 (6.23)	34 (1.81)	169 (8.99)	151 (8.04)	29	23.8
General	Before	362 (19.27)	697 (37.09)	648 (34.49)	172 (9.15)	1059 (56.36)	820 (43.64)		
	After	327 (17.4)	643 (34.22)	738 (39.28)	171 (9.1)	970 (51.62)	909 (48.38)	89	10.9

After the evaluation, we found that the level of physical activity increased among individuals, especially among women.

The group of males that received incentives for physical activity three times yielded the best results as compared to the group of males that received incentives for physical activity twice. In the group of females, the result was superior in the group evaluated twice. This may be due to the fact that the group of females receiving incentives three times was small, which may be considered as a limitation of this study.

The mean MET number increased generally, but mostly among female individuals. This result is probably due to the fact that there were more insufficiently active individuals among females. Studies of Latin American populations have shown that women generally report being more inactive than men[21].

There was a considerable decrease in the insufficiently active group; resistance to behavioral change was higher among sedentary individuals of both sexes.

Among females, the group that received three evaluations did not increase the mean MET number as compared to the group receiving two evaluations.

The sensitization index showed that women were more sensitized, suggesting that this group may tend to continue with behavioral change. A comparative study between males and females suggested that women have a higher tendency to exercise regularly in comparison to men[17]. The sensitization index assessment in our sample was considered very satisfactory, meeting the expected results, which demonstrate the effectiveness of incentives for physical activity in the form of motivational interventions.

CONCLUSIONS

These results show that projects encouraging the practice of physical activities to reach the current recommendations for health among insufficiently active individuals are extremely important, especially among sedentary individuals, who are more resistant to such change. Furthermore, the results demonstrated that the motivational intervention is an effective tool for promoting physical activity, especially when carried out continuously and for prolonged periods. We concluded that information programs explaining the health benefits of exercise and encouraging regular physical activity are extremely important.

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Erratum

In the manuscript "The impact of motivational interventions for increasing physical activity" published at "einstein. 2010; 8(1 Pt 1):46-52":

Page 46 stated Aneci Sobral Rocha, it should be read Aneci Sobral Rocha, Marcio Marega.