Distance from Home to Exercise Site did not Influence the Adherence of 796 Participants

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Abstract

Background: One of the difficulties in maintaining long-term adherence to exercise is the distance from home to the place of exercise.

Objective: To determine, for a private supervised exercise program (SEP), the influence of the home-SEP distance on adherence.

Methods: We identified 976 individuals and selected 796 who met the inclusion criteria. The home-SEP distance was obtained by the Google Maps. Adherence was determined by quartiles (months): 1-4, 5-12, 13-36 and more than 36. The clinical conditions were stratified as healthy, obese and/or hypertensive and/or dyslipidemic and/or diabetic patients without coronary disease; coronary artery disease patients and other health problems like cancer, respiratory disease and panic. The home-SEP distance was divided into (km): up to 1, 1 to 3, 3 to 10 and more than 10. For the statistical analysis, we used the Kruskal-Wallis ANOVA and the chi-square test.

Results: Of respondents, 46% lived up to 3 km, 39% lived between 3 and 10 km and about 15% lived more than 10 kilometers from the place of the SEP. No differences were found between the medians of the months of participation in the SEP as a function of home-SEP distance (p = 0.11).

Conclusion: For a given SEP in the city of Rio de Janeiro, open from Monday through Saturday with free choice of time, the home-SEP distance did not influence the adherence of participants. This was probably due to the quality of the service and/or lack of places closer to the participants' home. (Arq Bras Cardiol 2012;98(6):553-558)

Keywords: Rehabilitation; training; exercise; coronary artery disease.

Introduction

Physical inactivity and low fitness level have been considered as important risk factors for an early mortality[1]. On the other hand, there is sufficient evidence that it is possible to prevent and even change the course of manifestation of most chronic degenerative diseases, with direct or indirect interventions on the major modifiable risk factors such as physical inactivity[2,3], provided that there is adequate adherence to treatment. For practical purposes, adherence can be understood as a set of personal and environmental determinants that enables the free choice of people to adopt certain recommendations, which strengthens the patient's active role in participating and taking responsibility on their treatment[4,5]. In practice, this issue can be even more relevant for patients with chronic cardiovascular diseases[6].

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Adherence to treatment is critical for managing a chronic disease. For an adequate adherence, it is necessary to follow all medical instructions, which may include changes in lifestyle, in addition to taking the prescribed medication continuously. We cannot deny that many patients have difficulty following the recommended treatment. Low adherence is a global problem. Adherence to long-term care in developed countries is around 50%. In developing countries, rates are even smaller[7-10].

In this respect, the success of intervention programs is contingent upon recognizing the barriers that interfere with adherence. Some barriers are obstacles to longer participation in programs that use exercise as therapy. It is estimated that a significant proportion of participants quit exercise programs in the first six months[11]. The literature has also pointed out that most dropouts occur during the first three months, with similar results in all age groups, regardless of gender[12]. It is also known that only 25% of potential candidates for cardiac rehabilitation participate in formal exercising programs. Of these, 25% to 50% quit the program in six months, and up to 90%, in one year. Furthermore, only 25% of those who abandoned structured programs continue to exercise enough to maintain or improve the cardiorrespiratory capacity[13,14].

One of the difficulties in maintaining long-term adherence to exercise is the distance from home to the place of exercise. In Brazil, studies on adherence to supervised exercise programs are

relatively recent[15,16]. Some relevant scientific gaps are still found.

The objective of this study is to determine the influence of home-SEP distance to a private supervised exercise program.

Methods

This study is characterized as a survey, using secondary data. From a Private Supervised Exercise Program (ESP) under regular operation since 1994, with in-person medical supervision and clinical data carefully recorded, 976 participants attended sessions from 2001 to 2010. Out of these participants, 796 were selected, of whom 546 were men and 250 were women who met the following inclusion criteria: a) home address in the cities of Rio de Janeiro or Niterói; and b) availability of detailed data regarding clinical condition. All of the 180 individuals (18.4%) who were excluded lived in several other cities in the state of Rio de Janeiro or in other states and participated in the SEP in specific situations, such as vacations or at an early stage of treatment. Personal data obtained in the initial evaluation of the SEP have identified, in a simplified manner, the presence and the standard of labor activity and the professional background of patients.

The building where the SEP is located is easily accessible, with bus stops and subway stations nearby, and has its own parking lot. The shortest home-SEP distance informed by the software application Google Maps (Google Inc. USA) was used to stratify participants.

Initially, the sample was divided into quartiles by the time of participation in the SEP, corresponding to: 1-4 months (Q1), 5-12 months (Q2), 13 to 36 months (Q3) and more than 36 months (Q4), compared to the following four variables: age, gender, clinical condition, and distance from home to the SEP.

Specifically concerning the clinical conditions, the participants were stratified as: I - healthy; II - obese and/or hypertensive and/or dyslipidemic and/or diabetic without coronary artery disease; III - coronary artery disease patients and IV - other health problems like cancer, respiratory disease and panic. As for the home-SEP distance, the stratification was: A - up to 1 km; B - 1 to 3 km; C - 3 to 10 km and D - more than 10 km.

Before starting the SEP, the participants underwent an evaluation that included clinical examination, spirometry and 12-lead electrocardiogram at rest, cineanthropometry (anthropometric measurements, assessment of body composition, muscle strength and power and flexibility), four-second exercise test and maximum cardiopulmonary exercise test, the data of which supported the individualized prescription of exercise sessions.

The SEP was carried out in air-conditioned environment, with temperature control between 21 and 24ºC and relative air humidity ranging from 40 to 60%. The sessions included aerobic exercises, muscle strengthening, flexibility, balance and coordination, usually lasting 60 to 75 minutes. As an important feature of this SEP, participants attended three to six times a week and had freedom of choice of days and times to attend the sessions, within the period of regular operation of the clinic - 15 hours on weekdays and 9 hours on Saturdays, totaling 84 hours per week.

For statistical analysis, data measured on a nominal scale are presented by the frequency and distribution percentage, while those for parametric ratio and distribution, we calculated the averages, standard deviations and minimum and maximum values. To compare the medians of months of participation of the four quartiles, we used the Kruskal-Wallis ANOVA. The chi-square test contrasted participants' distributions regarding age, gender, clinical condition and distance from home to the SEP by quartiles of the number of months of participation in the SEP. A level of significance of 5% probability was established.

Results

Participants' median length of stay in the SEP was 12 months in a non-parametric distribution with an average of 27 months. The demographic and clinical characteristics of participants are described in Table 1. It is observed that there was a predominance of male participants, without a difference between the ages of the participants of both genderes (mean ± standard deviation): 62.3 ± 13.1 and 63.4 ± 13.6 years ($p = 0.145$). There were no differences as to the adherence to the SEP by age ($p = 0.974$) and gender ($p = 0.160$).

According to the clinical conditions, most of the sample (56%) was composed of members of the group III (coronary artery disease patients) followed, in descending order, by groups II (hypertensive, dyslipidemic, obese and/or diabetic patients) with 34%, IV (other diseases or clinical conditions) with 6% and I (healthy) with only 4%, the latter including several spouses of participants classified in the other groups.

Among the 796 patients included in the final analysis of data from this study, 286 (35.9%) could be classified as inactive in terms of formal employment, including pensioners of both genderes and 50 women self-reported as "housewives." Although there has been a natural tendency for older patients to be professionally inactive, this was uniform, as many younger patients, due to illness, had been retired. On the other hand, some of the older patients, especially those who owned their own businesses, were still very active.

Based on data available for 728 of 796 patients (91.5% of the total sample), concerning professional background and/or professional practice, one can see that some more traditional backgrounds are quite common, with 17.0% of physicians, 14.6% of engineers, 9.9% of lawyers, representing 41.5% of the total. Other professionals of exact sciences, health and economics, business managers and accountants totaled 14.1%, while public officials and military officials amounted to 7% of the sample available. Note also the fact that other 56 patients (7.7%) self-reported as owners of their own activity - businesspersons, traders, farmers etc.. A portion of 5.3% of patients reported teaching as a primary professional activity, mostly in higher education. Only 30 other patients (4.2%), including ten students, had no higher education, acting as mid-level professionals.

In fact, it was observed that professional background and reports of being retired or not under the social security

system or similar systems did not accurately reflect the degree of formal commitments that could interfere with patients' adherence to the SEP. In many cases, non-professional commitments such as caring for the health of the spouse or parents, were often more disturbing than strict working hours, a relatively uncommon standard in this sample of patients. Within this context, and due to the probable inaccuracy, it was decided not to perform a specific analysis related to these aspects.

Due to its potential influence on adherence to the SEP, another variable analyzed in the study was the participants' type of morbidity. The distribution of individuals in different quartiles of adherence, according to the clinical condition of patients who, is described in Table 1. It can be observed that most healthy individuals remain in the SEP for one year only, while those with some morbidity tend to stay in the program longer. However, these results were fairly similar, reaching threshold values for statistical significance between quartiles ($p = 0.057$).

Considering the home-SPE distance, fewer than half (46%) of participants lived up to 3 km away from it, while 39% lived 3 to 10 km away and about 15% lived more than 10 kilometers from the SEP. This geographical distribution of participants in different quartiles of time spent in the SEP is illustrated in Figure 1. It can be observed that there is a similar percentage ($p = 0.414$) between the distribution of values. When the medians of the months of stay in the SEP were compared according to the distribution of participants by four layers of home-SEP distance, no differences were found ($p = 0.11$).

Discussion

A (SEP) is characterized by a situation in which individuals perform exercise prescribed and directed by the physician on an ongoing basis throughout life. It differs from a conventional program of exercise for the supervision of a qualified physician, individualized clinical prescription of exercise, within the principle of seeking the appropriate dose of exercise, in which the benefits will be maximized and risks and collateral effects are minimized[17]. It also differs from cardiac rehabilitation that has 'terminal' characteristicsand is traditionally divided into four phases[18].

Biopsychosocial factors that affect adherence to a SEP can be classified into three categories: individual, interpersonal, and environmental. Environmental factors may include the culture, home, work, physical environment, and access and costs[19]. Adherence to physical exercise helps to combat the progression and control of chronic degenerative diseases, especially cardiovascular diseases in all age segments. Despite this recognized importance, there are relatively few controlled interventions to promote physical exercise for the elderly[20] and similar influences between the different categories that interfere with adherence.

In a SEP where there is strict control of participant data, it is possible to obtain and analyze data that will lead to a better understanding of phenomena involving the use of regular exercise, and adherence in particular.

Women are very often underrepresented in studies on the treatment of cardiovascular diseases[21] and in those involving cardiac rehabilitation[22]. In this study, we found that there was a greater predominance in the SEP of men against women. However, as opposed to what has been reported in some studies[23,24], in which women are less likely than men to participate in these programs, this was not observed in this study because there were no significant differences for participants in the two genderes. Published data suggest that the dropouts from cardiac rehabilitation programs may vary from 40 to 60% over a period of six months[25], with most studies demonstrating the highest dropout rates for women compared to men[26]. On the other hand, in this study, the average length of stay of the participants in the SEP was approximately 30 months, showing a distinct profile of adherence against other forms of exercise programs.

It is discussed in the literature[27] that the variable of age is one of the individual factors that may influence participants' length of stay in a program of physical activity or exercise. However, it is important to note a tendency for an inverse relationship between the prevalence of the habit of regular physical exercise and age, that is, as age increases, men and women tend to be less active. In this study, participants' age did not influence the length of stay in the SEP.

Several studies[28-31] on adherence to physical activity programs are associated with some morbidity and comorbidity variables involved in that process. This study,

Table 1 - Distribution of demographic and clinical variables of participants according to quartiles of length of stay in the SEP

Variables	1st Quartile 1 to 4 months n = 199	2nd quartile 5 to 12 months n = 199	3rd Quartile 13 to 36 months n = 202	4th quartile > 36 months n = 198	Total n = 796	
Age (years) ♀/♂	62.3 ± 14.4	62.8 ± 14.1	62.6 ± 13.9	62.7 ± 10.5	62.6 ± 13.3	p = 0.974
Gender						
Male	130 (24%)	130 (24%)	132 (24.5%)	147 (27.5%)	539 (67.7%)	p = 0.160
Female	69 (27%)	67 (26%)	70 (27.5%)	51 (19.5%)	257 (32.3%)	
Clinical Condition						
I	14 (44%)	10 (31%)	6 (19%)	2 (6%)	32 (4%)	
II	63 (23.5%)	62 (23%)	80 (30%)	63 (23.5%)	268 (34%)	p = 0.057
III	108 (24%)	116 (25.5%)	103 (23%)	117 (26.5%)	444 (56%)	
IV	14 (27%)	9 (17%)	13 (25%)	16 (31%)	52 (6%)	

by looking at this issue, showed that healthy individuals tended to remain in the SEP for one year, while unhealthy individuals, stratified as groups II, III and IV, showed a fairly even distribution of participants by quartiles of length of stay.

Surprisingly enough, regarding the influence of the home-SEP distance on the adherence to the program, the results did not confirm the existence of any relationship. Considering that at the environmental level the adherence factor most commonly studied is the place of exercise, that is, whether the exercise is performed at home, individually directed, or away from home, supervised and based on protocols, it seems to affect the adherence. Randomized clinical trials seem to support the hypothesis that programs performed at home, especially those of moderate intensity, have a better adherence[32]. However, the exact mechanisms that increase this adherence are not objectively clear.

Taking into account the individual level, some factors may be more important as predictors of adherence to exercise, including the self-monitoring and past behavior, that is, the habit of exercising regularly throughout life[32]. In this context, the history of the habit of physical exercise or sport can materially influence and perhaps even predict who will or will not adhere to a regular program. This question has not been objectively analyzed in this study but should be subject to future investigations.

Commitments of time that includes the period of commuting to and from the place of exercise, as well as post-exercising shower facilities, have also been placed as a barrier to adherence[27]. As in the SEP studied, approximately 85% lived within 10 km away from the place of exercise, the placed is well served by regular lines of urban transport, especially a subway station located 200 meters from it, and facilities are equipped with post-exercising shower. This is very likely to have affected the high levels of adherence found.

It is worth noting that physical activity or exercise should be performed systematically by the individual on their own initiative, either alone or in groups, in order to be effective. In addition, free physical activity programs represent unique challenges in comparison with supervised programs. Participants have a greater power of decision to exercise freely, rather than in a physical exercise program. Participants must determine when and where to perform the activity and use their self-motivation[27]. On the other hand, it seems clear that there is much to be done in relation to adherence to preventive therapies, which are known to be quite low, reporting that only 5% of adults engage in physical exercise in the recommended amount for the purposes of benefiting their health[33].

As discussed above, participation in programs of supervised exercise consists of a complex set of behaviors, which makes it more difficult to identify which factors contribute to or hinder adherence, particularly among middle-aged adults and the elderly. Predictors of adherence may be different for supervised and unsupervised exercise. Moreover, predicting adherence to supervised exercise may be particularly difficult, even on well-controlled studies[34].

Equally important, it is worth pointing out that there are some limitations in this study. Although some participants had their home address registered in the SEP, they attended the place of exercise from their workplace rather than from their residence. Although it was possible to control this variable in this retrospective study, the best evidence available suggests that a very small and little expressive number of participants were in a peculiar situation of going to work, participating in the SEP and returning to work. Worthy of note is that a large portion of participants was no longer involved in professional activities with regular working hours and fixed places of work.

Because it is a private program, it is thought that the participants had socioeconomic conditions that enabled them to commute to the SEP regardless of the distance from their homes. The economic and cultural standard of the patients was quite high. Most of them had a higher education diploma, and high-profile professional background or income. In fact, among the professionally active ones, who represented a large portion, self-employed individuals

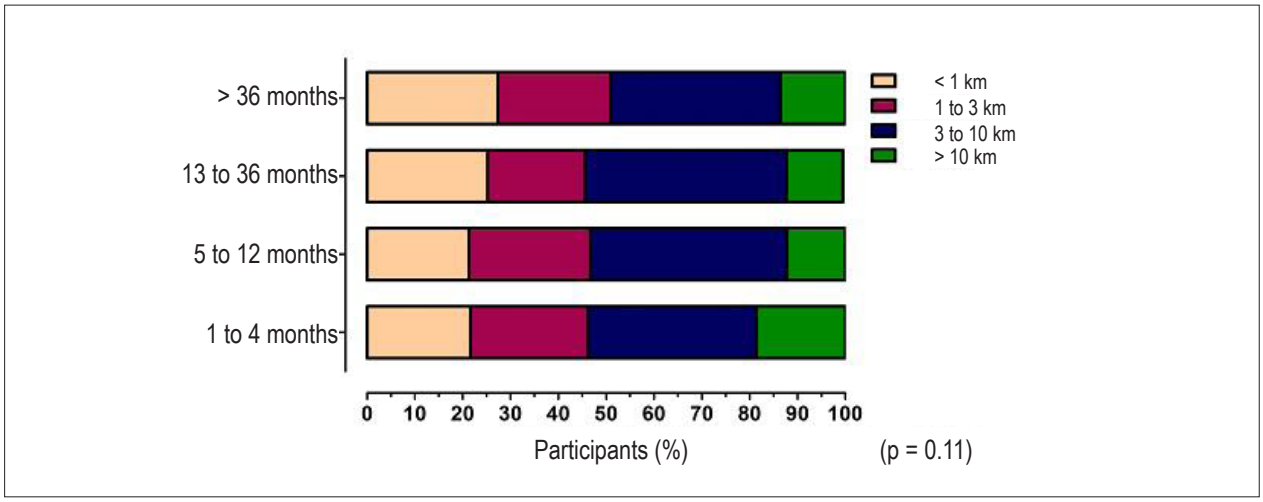

Figure 1 - *Geographical distribution of participants in different quartiles of length of stay in the SEP.*

or business owners - virtually all of them had the flexibility to define and manage their professional schedule, thereby facilitating the adherence to the SEP with free choice of time. Patients with other profiles in these aspects may have different results. The clinical condition used to classify the participants was recorded at the beginning of the program and some of them have changed this profile during the SEP. Thus, the observations taken should be interpreted in the light of these limitations and in consistence with the characteristics of this SEP and the study participants concerned.

Conclusion

In summary, the results indicate that for a given private SEP in the city of Rio de Janeiro (Copacabana), which operates from Monday to Saturday with free choice of exercising schedule, the distance between the place of residence and the place of exercise had no effect on adherence. This may be due to patient characteristics and to the quality of the service offered and/or lack of similar options offered at locations closer to the participants' homes.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

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