Exercise prescriptions given by GPs to sedentary patients attending chronic disease clinics in health centres – The effect of a very brief intervention to change exercise behavior

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Abstract

Aim: To determine the effect of a very brief structured exercise prescription given by general practitioners (GPs) to sedentary patients attending chronic disease clinics in a primary care setting lead them to begin exercising. Materials and Methods: One hundred and six patients of the intervention (INV) group were counselled for 1–2 minutes individually about a benefit of regular exercise after which a written exercise prescription was provided by the GP. The 110 patients in the control (CON) group received usual care given to patients attending health centres. The patients in both groups were called at both one month (T₁), and three months (T₃) post intervention, respectively where they were interviewed about their current exercise habits. Results: At T₁, 84/106 (79.2%) of INV vs. 34 (30.9%) of CON were exercising and at T₃, 79/106 (74.5%) of INV vs 19/110 (17.4%) of CON were exercising at least one time weekly (P < 0.0005). Greater than 90% of patients who began exercising “agreed/strongly agreed” that the doctors’ advice was “important to start exercising.” Conclusion: The brief intervention seemed to be more effective than regular care in getting patients to begin exercising at 1 month and 3 months post intervention than regular care. The intervention was well received by most of the patients receiving the intervention.

Keywords: Diabetes mellitus, hypertension, physical activity, primary care

Introduction

There are many health benefits associated with regular exercise which include improved quality of life¹ and reduced mortality from coronary heart disease.² Furthermore exercise has been shown to improve glycaemic control in patients living with diabetes mellitus (PLWD), reduce blood pressure in patients living with hypertension, produce favourable changes in lipid profiles in patients living with dyslipidaemia and reduce body fat in obese persons.³ Despite all the scientific evidence supporting exercise as a means of treatment or as an adjunct for treatment for common chronic medical conditions, large portions of persons living in both developed⁴ and developing countries⁵ are sedentary with about 30%–40% of these populations being inactive. As such attempting to get sedentary patients attending primary care clinics, with modifiable risk factors for heart disease, to begin exercising should be considered as a primary prevention modality and therefore becomes an essential part of consultations.⁶

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Many patients expect advice about exercise to come from their general practitioners (GPs) despite the limited time of the doctor–patient consultation. Exercise prescriptions (EP) given in primary care appear to be a motivating factor for patients to improve their frequency of weekly exercise. EP and verbal advice about exercise given to patients have been found to lead to their short-term increase in weekly exercise participation over patients receiving verbal exercise advice alone. EP, counselling and/or exercise booklet or EP and supplementary reading material seem to be superior to exercise prescription alone in increasing exercise duration. GPs working in primary care settings were found to be positive about giving EP in their practices but are limited by time constraints to do so. Interventions take an average of 5–13 minutes more than the usual consultation times to be administered.

In some studies, practice nurses assisted GPs with the exercise counselling and exercise specialists assisted with the follow up and exercise sessions.

Some studies in the UK and USA have looked at primary care referral to community-based exercise and leisure facilities and though the results for short-term increases in exercise participation are good, the cost effectiveness of such referral schemes have not been established. In addition, the health outcomes of such referral schemes have led to reduction in depression among patients but not in any other health outcomes. In addition, some communities do not have leisure centres. In Sweden, patients tended to prefer home-based exercise programs over community-based programs.

Many persons partaking in these studies have been already exercising at the time of enrollment into these studies. “Sedentary” patients have been defined differently in different studies with some studies looking at persons who exercise less than five times per week as being sedentary and some looking at less than 30 minutes per week of exercise as being sedentary. Attempting to get truly sedentary patients to begin exercising is more difficult than getting persons already exercising to increase their weekly exercise load.

Trinidad and Tobago is a developing nation with the major cause of mortality resulting from cardiovascular disease. The country ranks among the top five countries with the highest prevalence of PLWD. Previous studies showed that about 1/3 persons aged 15–75 years old did not partake in any form of physical activity and that 28% of adolescents aged 15–19 years were inactive. There was a high positive correlation between persons who knew at least one benefit of exercise and their participation in regular exercise. There are inadequate amounts of community trained nurses to counsel patients about exercise. There are no well-organized community-based exercise facilities to refer patients to and although the consultation times have increased from about five minutes per patient in a previous study done to about 8 minutes at present (personal observation, TB), it still represents an inadequate length of time for offering the standard prescriptions. In such a setting, it becomes the responsibility of the GP to offer advice to patients about exercise. Such advice should be brief so as not to upset the functioning of the clinic and should involve home-based physical activities.

The major aim of this pilot study was to determine the effect of a very brief structured intervention in addition to a regular consultation aimed at improving a patient’s knowledge of the benefits of exercise and providing a written exercise prescription to sedentary patients attending chronic disease clinics in health centres did lead to these patients becoming physically active at one month (T1) and three months (T2) post intervention. Minor aims were to determine what the patients’ perspectives were of the program and how the quality of life and disease control was assisted by the participation in the exercise programs.

Materials and Methods

Selection and description of participants

This study took place within the South West Regional Health Authority (SWRHA) in Trinidad, West Indies at five health centres. All patients reporting for their chronic disease clinic (CDC) appointments between January–February 2013 were eligible for partaking in the study. Patients attending one health centre received the intervention (INV) and the patients attending the other health centres served as the control group (CON). The centre where the patients received the intervention was selected by convenience. Figure 1 shows the number and flow of patients at each step of the selection process. Patients were enrolled, their addresses and telephone contact were recorded and those in the INV were given a piece of paper with the template of an exercise prescription. This served as a cue for the doctor to administer the exercise intervention for the said patient after the completion of the regular consultation. Patients in the CON

![Figure 1: The selection process to obtain participants for this study](image-url)
were enrolled and not given any exercise prescription. They received usual care provided by their GP. They were told that the doctors would be following up on their medical care for the next three months.

**Intervention**

An example of the use of the brief exercise prescription is given in the supplementary file attached. The intervention was geared to last 1–2 minutes. The patient was asked for the major reason that they were not exercising. Then a health benefit of exercise was told to the patient using cues from the patient's blood sugar readings, blood pressure readings or recent blood investigations. This conformed to the Health Belief Model. The patient was advised that he/she should be exercising on a regular basis. No mention was made of the currently recommended weekly exercise by the American College of Sports Medicine (ACSM) as the authors believed that sedentary patients should be encouraged to begin exercising first before they are told of or advised of the recommendations. The prescription was given by one of two doctors – one who was trained in sports and exercise medicine and one who received a 60-minute training program in prescribing exercise. The prescription was then provided as to the type of exercise which was usually home-based activities like walking, alternating walking and running, running or cycling. The frequency of exercise told should be at least twice weekly for at least 20 minutes each session. The exercise should be done at an intensity where maintaining a comfortable conversation is very difficult. They should start slowly and gradually build up intensity. Persons who had long work hours and could not exercise as a result were advised on accumulating exercise in 10-minute sessions. Persons were advised to drop at a more distant bus/taxi station and walk the extra distance to or from work or walk during their lunch hour. Patients who experienced chest pains, palpitations or extreme shortness of breath were advised to stop exercising immediately and seek medical care.

The patients were called by a blinded interviewer at T₁ and T₃ (1 month and 3 months post intervention) and an exercise prescription was filled over the telephone looking at the patient’s exercise habits in the preceding week. They were asked “In the last week, did you exercise?” If yes then the type, frequency and duration of exercise done was recorded. After the three month follow up, those patients who were exercising were then asked: “the doctor’s advice was important in me starting to exercise regularly,” “I have less body pains since I exercise regularly,” “I feel more energetic since I began exercising regularly,” “I sleep better since I began exercising regularly,” “Exercise will become a routine part of my weekly plans;” “My sugar tests at home are better since I exercise regularly,” “My Blood pressure readings are better since I began exercising regularly.” These were then rated on a Likert scale from “Strongly disagree,” “Disagree,” “Agree” and “Strongly agree.” For those who were exercising, the cost in dollars to start an exercise program was asked. Persons who were called and no responses were obtained were called for a further four times. If there were no response the District Nurse attached to the Health Centre was asked to visit the patient together with a researcher during their health visits and administer the questionnaire.

For those who were not exercising at 3 months, the reason/reasons were asked as to why they were not exercising.

**Ethics and statistics**

Ethical and institutional approvals were obtained from the Clinical Governance and Ethics Committee of the South West Regional Health Authority (SWRHA) under whose jurisdiction the study fell. Ethical approval was obtained to keep patient’s addresses and telephone numbers to contact them for follow up reasons. Data was analyzed by SPSS version 20, Chicago, IL, USA. Frequencies were used for categorical data, Chi-square and OR for associations between categorical variables. Paired t-tests were done comparing the control and the intervention groups. A level of significance was set at less than 5%.

**Results**

A total of 216 patients participated in the study of which 106 participants were enrolled in the intervention group (INV) and 110 patients were enrolled into the control group (CON). The baseline characteristics of both groups are shown in Table 1. INV had significantly more PLWD than CON. Significantly more patients belonging to INV were exercising at T₁ and T₃ than those belonging to CON. This is shown in Figure 2 below. At T₁, 84/106 (79.2%) of INV vs. 34 (30.9%) of CON were exercising and at T₃, 79/106 (74.5%) of INV vs. 19/110 (17.4%) of CON were exercising at least one time weekly (P < 0.0005 for differences).

When the data were analyzed controlling for diabetic patients at 1 month, 83.3% of INV vs. 27.1% of CON exercised (P < 0.0005) and at 3 months 79.2% of INV vs. 15.9% of CON exercised (P < 0.0005). There were no significant associations or predictors for exercise based on gender, age

![Figure 2: The percentage of participants exercising at one and three months post-intervention](image-url)
of patient and weather the patient had diabetes mellitus, hypertension or dyslipidaemia.

A sample of eight consultations were recorded with patients’ permission and timing showed that it took an additional average 93 seconds ±13 seconds extra to deliver the exercise prescription.

Table 2 shows the differences between CON and INV groups in terms of frequency, intensity and duration of exercise at T1 and T3. Walking was the most common form of exercise in both groups.

The cost to the patients to partake in this study was as follows: in 50 (62.5%) persons it costed no money. In 21 (26.3%) patients it costed between $1 and 300.00 TT, in 9 (11.3%), it costed greater than $300 (1 TT = $0.15). In persons who did not exercise, a lack of time was attributed as the major reason in 97/120 (80.8%).

As seen in Table 3, the patients’ views were recorded. Greater than 90% of patients who began exercising “agreed/strongly agreed” that the doctors’ advice was “important to start exercising,” “was adequate on how to approach exercising” and that “exercise will be part of my weekly routine.”

Discussion

The major finding of this study is that a very brief intervention when administered by GPs to truly sedentary patients with chronic diseases attending a primary care clinic, led to 80% of patients beginning to exercise at one-month post intervention and 75% exercising at three months. A systematic review showed that counselling which included written material for patients, considered behavior change for the patients and provided training for the doctors were effective in improving physical activity in the short term. In Sweden primary care, 56% of patients who were prescribed exercise to activity centres or home-based activities by primary care staff which included doctors, physiotherapists and nurses were active at 3 months post intervention. These patients were all not sedentary at the start of the study and only 49% of those who were truly sedentary at the start of the study exercised at 3 months post intervention.

In this current study, a sedentary patient was one who did no form of exercise in the preceding three months. Attempting to get truly sedentary patients to begin exercising is more difficult than getting persons already exercising to increase their weekly exercise load.

Table 1: Baseline characteristics of the intervention and control groups

|                      | Intervention group, n=106 | Control group, n=110 | P for difference |
|----------------------|---------------------------|----------------------|------------------|
| Mean age (SD), years | 55.0 (10.8)               | 56.8 (12.4)          | 0.29             |
| Gender               |                           |                      |                  |
| Male (%)             | 37 (34.9)                 | 43 (39.1)            | 0.62             |
| Female (%)           | 69 (65.1)                 | 67 (60.9)            |                  |
| Patients have diabetes (%) | 54 (52.9)       | 39 (35.8)            | 0.02             |
| Patients have hypertension (%) | 69 (67.6)    | 80 (73.4)            | 0.44             |

Table 2: Comparison between the intervention (INV) and control (CON) groups at 1 and 3 months post intervention on type, frequency, intensity and duration of exercise performed

| Exercise parameter                                      | At 1-month post intervention (T1) | At 3 months post intervention (T3) | P  |
|---------------------------------------------------------|----------------------------------|-----------------------------------|----|
| Duration of session (SD), mins                          | INV, n=84                        | CON, n=34                         | 0.39|INV, n=79               | CON, n=39 |<0.0005|
| Frequency of exercise (SD)/week                         | 20.2 (12.1)                      | 23 (16.8)                        | 0.39|23.4 (10.8)              | 31 (18.5) | 0.03|
| Intensity (could not hold comfortable conversation - during exercise [%]) | 4.1 (1.9)                      | 5.1 (2.2)                        | 0.014|4.8 (2.6)               | 4.5 (2.2) | 0.56|
| Type of exercise - Walking (%)                          | 65 (77.4)                        | 25 (73.5)                        | 0.84|75 (94.9)               | 9 (45)     |<0.0005|
| Type of exercise - Walking (%)                          | 78 (92.9)                        | 28 (82.4)                        | 0.39|66 (83.5)               | 16 (85)    |<0.0005|

Table 3: Patients’ views of the program and subjective measure of their outcomes at 3 months post intervention among those who received the intervention and who exercised (using Likert Scale)

| Question                                                                 | Strongly disagree | Disagree | Agree | Strongly agree |
|---------------------------------------------------------------------------|-------------------|----------|-------|----------------|
| Doctors’ advice was important for me to start exercising, n=80            | 0 (0)             | 3 (3.8)  | 35 (43.8) | 42 (52.5)      |
| I have less body pains since I started exercising, n=80                   | 3 (3.8)           | 16 (20)  | 43 (53.8) | 34 (42.5)      |
| I feel more energetic since I started exercising, n=80                    | 0 (0)             | 9 (11.3) | 51 (63.7) | 20 (25)        |
| I sleep better since I began exercising, n=80                            | 0 (0)             | 16 (20)  | 44 (55)  | 20 (25)        |
| My blood sugar readings done at home have improved since I started exercising, n=39 | 0 (0)             | 8 (20.5) | 26 (66.7) | 5 (12.8)       |
| My blood pressure readings done at home have improved since I started exercising, n=57 | 0 (0)             | 9 (15.8) | 38 (66.7) | 10 (17.5)      |
| Exercise will become part of my weekly plans, n=80                       | 2 (2.5)           | 3 (3.8)  | 34 (42.5) | 41 (51.2)      |
The intervention started with stating a simple benefit of exercise to the patient. This was usually related to the health condition that the patient suffered with or a general expression that “patients who exercise regularly live longer than those who do not exercise.” A previous study done in the geographical area where this current study was conducted found that patients who knew at least one benefit of exercise were more likely to be exercising than those who did not know any benefit of exercise.[5] The very brief intervention that was administered by the GP lasted an average of 93 seconds, which is significantly much shorter than the 5–13 minutes previously described in the literature when a healthcare professional administered the exercise prescription.[1,10] Time constraints were often cited as the major reason why GPs do not prescribe exercise to patients in primary care settings.[19] In such cases, a very brief intervention becomes of paramount importance to be given to patients.

Most patients who began exercising in this study started with walking. Few patients graduated to running over the three months. Swedish patients in primary care settings were found to be more compliant with home-based physical activities over facility-based activities.[10] In the Caribbean, exercise facilities are not readily available for patients to access and where they are available the cost to access them may be prohibitive for the average patient. In the UK, “lack of money” was a significant barrier to adherence to exercise at exercise facilities.[20] In attempting to get patients to begin exercising, the GP has an important role in identifying patients who are sedentary and to recommend home-based activities for the patients that could easily be incorporated into the daily routines of patients.

The cost for patients to participate in community-based programs have been cited as a barrier to partaking in exercise referral schemes by many patients and the cost effectiveness of these programs are undetermined. The cost to participate in this program is miniscule and may have included purchasing shoes and exercise garments. The few who bought exercise equipment like cycles and treadmills obviously incurred a greater cost but more than 90% of participants incurred a cost of less than $50 USD.

A lack of time has been cited as the major reason that most persons did not exercise and this was similar in a previous study done in a similar setting.[15] These patients should be advised of accumulating exercise in two to three 10-minute intervals during the course of the day.

Some unexpected findings were demonstrated in this study when the INV and CON groups were compared in Table 2. The CON received usual care but those in the CON who began exercising on average exercised an average of 3 minutes more per session, one more time per week and a similar percent of participants achieved a suitable intensity of exercise when compared with those in the INV at one month. At 3 months, the INV were doing similar amounts of weekly exercise of shorter duration and of at a higher intensity than those in the CON. The fall out rate for the CON was 44% vs. 6% in INV over the 3 months. Despite the differences in the exercise participation rates between the INV and CON, 30% of those who received usual care were exercising at 1 month post enrolling into the project. This could have been partially due to the concept of New Year’s resolutions where persons make promises to make positive changes in their lives for the New Year. Starting exercise programs and getting fit are usually among the top three resolutions for persons. The compliances with these resolutions are quite low.[23] The study started in January so the relatively high number in the CON who were exercising after the first month may have been due to these resolutions. Another factor may be persons started to get fit for the Carnival season which is held in February or March in Trinidad and Tobago.

Looking at the patient’s subjective views of the program, it appears that exercise advice coming from a doctor was important in motivating patients to start exercising as more than 95% of patients who received the advice agreed or strongly agreed. Patients prefer advice from their doctors about exercise and more than 80% of patients previously surveyed revealed that exercise advice should come from their doctor or health care professional.[5] Similarly more than 90% of persons exercising said that exercise would become part of their weekly routine. A longer study is needed to confirm whether these patients will adhere to this program.

There were two major limitations of this study. First the groups were not randomized. This was due to the study being done in community centres where couples and neighbours attend. Couple did not want to be put into different groups and many patients wanted to be in the group with the paper given to them (the CON). However, the groups were fairly similar at baseline except for the proportion of PLWD being significantly different between the groups. The results of the study were very similar even after correcting for the differences in diabetic patients in each group.

Second the questions about glycaemic control, sleep, pain and blood pressure control were only asked to persons who exercised and not asked to the control group and persons who did not exercise. Had these questions been asked, this would have added good comparisons between those who exercised and those who did not. This was a deficit in this study which was unfortunately noted in retrospect. Initially these questions were asked to get the participants’ view on the benefits of such a program, rather than looking at comparisons of these parameters between those who exercised and those who did not.

Though not measured, about 80% of patients who did self-monitoring agreed or strongly agreed that their actual glucometer and blood pressure readings had improved since they started the exercise program. In addition, about 75%–90% of the patients who began exercising agreed that exercise results in less body pains, better sleep and patients feeling more energetic since
they began the exercise program. These self-reports suggest that the intervention was well received by most patients and that they experienced positive results from starting to exercise.

**Conclusion**

A very brief intervention given to sedentary patients with chronic diseases in a primary care setting appeared to be successful in motivating more than three quarters of them to be start and be adherent to exercising in the short term. In addition, the intervention is very low cost to implement, is well received by most patients and appear to lead to a subjective health benefits which include less body pain, feeling more energetic and better sleep in most patients. Self-reports of improved blood sugar and blood pressure readings by home monitoring were stated since these patients began exercising.

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**Conflicts of interest**

There are no conflicts of interest.

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Supplementary Material

Exercise Intervention - how to administer Exercise Prescription

1. The patient should be screened for participation in exercise before coming to doctor, if sedentary and meets inclusion criteria, give a blank exercise prescription template.

When the patient presents to the doctor for a routine consultation:

a. The doctor acknowledges that the patient does not exercise.

b. The doctor gives one positive fact about regular exercise and health and strongly recommends it:

“If John, I see here that you don’t exercise, but I want you to know that persons who exercise regularly have better blood pressure readings than those who do not exercise, so I strongly recommend that you exercise regularly.”

c. The doctor enquires about the major reason that the patient does not exercise:

“John, what is the major reason for you not exercising?”

The patient’s responses are usually “lack of time” or “don’t really consider it as important”, or “don’t like exercising alone”.

d. The doctor tries to work with the patient on 1-2 ways to overcome this barrier. e.g. Lack of time: accumulate 10 minute segments of exercise three times daily viz: drop off or park further from the work place or walk around during lunch time.

If the patient doesn’t think it is important, emphasize the health benefits of exercise and suggest ways to make it interesting:

“If you don’t like exercising alone - try a group or family event, or getting friends involved.”

e. The doctor then advises about the type of exercise, frequency, intensity and duration of exercise. At this stage the recommended guidelines should not be discussed. This is then written on the prescription template.

Type: walking/walking and running, cycling

Duration: at least 20 minutes

Frequency at least 2 times per week

Intensity: at a pace which the patient cannot hold a comfortable conversation (Mild-Moderate).

f. The doctor advises on follow up: schedules follow up appointment. At this appointment the patients who are exercising can be told of current exercise guidelines and goal setting can be done.