Exercise on prescription: guidelines for health professionals

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SUMMARY
Exercise has the capability to improve many aspects of health, yet national surveys have indicated that the general population is not exercising sufficiently for such benefits to accrue. With a great proportion of the population attending general practices each year, general practitioners have a unique opportunity to increase the prevalence of exercise. With such a realization, ‘exercise on prescription’ schemes, in which general practitioners prescribe exercise as an alternative to medication, have become increasingly popular within the United Kingdom. However, few guidelines as to good practice exist. This paper aims to bridge this gap prior to the availability of detailed evaluations, by drawing upon the experiences of a scheme established in 1993 by the LIFE Project, a community-based heart disease prevention programme. The scheme currently has 22 general practices referring patients to a coordinator who decides upon the most appropriate form of exercise prescribed after an introductory consultation and a health check. To date, over 600 patients have been referred. The paper focuses upon various aspects associated with exercise on prescription including patient selection, targeting of general practices and leisure venues, ethical considerations, adherence issues, and the most appropriate specific exercise options.

Key words: exercise prescription; physical activity

INTRODUCTION
Recent research suggests that firm advice from general practitioners (GPs) could motivate patients to exercise (British Heart Foundation, 1996). However, it appears that intervention must go further than advice if major changes are to occur. This has happened in a number of general practices under the auspices of ‘exercise on prescription’, whereby patients are offered the opportunity to attend exercise sessions as an alternative to the prescription of medication. It is recognized that the term ‘exercise’ is often employed to refer to a specific form of physical activity, usually involving greater structure, discipline and with the specific dimensions of intensity, duration and frequency. ‘Prescribing physical activity’ is probably a more appropriate description, but common usage has determined the term ‘exercise on prescription’. To become involved in a variety of physical activities would be the ideal lifestyle change, but for the purpose of this paper, exercise is used as a convenient analogue.
A great deal of evidence has indicated that physical activity has the capacity to improve health, both physiological and mental (Royal College of Physicians, 1991). For example, those individuals who are physically active are at a lower risk of coronary heart disease than less active persons, show diminished age-related declines, have fewer osteoporotic fractures, a higher life expectancy, and higher rates of avoiding functional loss (Powell et al., 1987; Biddle and Fox, 1989; Paffenbarger et al., 1990; Wagner et al., 1992). Despite this, physical activity levels are exceptionally low among the adult population in the UK. The Allied Dunbar National Fitness Survey (1992) found that seven out of ten men and eight out of ten women fell below their age-appropriate activity level necessary to achieve a health benefit. Consequently, the Health of the Nation documents increasing exercise levels as one of the main targets for reducing the incidence of coronary heart disease (CHD) (Secretary of State for Health, 1992). With 70% of a general practice population passing through the waiting room of a general practitioner each year (Fry, 1993), the potential number of candidates for ‘exercise on prescription’ is substantial.

However, Iliife and colleagues (1994) advised that ‘while we await the results of careful evaluation, primary health care teams should look closely before they leap into prescribing exercise’. Even with the shortage of such evaluation, ‘exercise on prescription’ is becoming increasingly popular throughout the country. A review of the literature indicated schemes in the following areas: the ‘Brockenhurst Healthy Village Project’ (Browne, 1994); Stockport (Green and Lord, 1994); East Sussex (Webborn, 1994); and South Molton (Ayres and Pocock, 1995). The majority of these schemes have indicated beneficial changes, although the evidence at present is mainly circumstantial and based upon self-reports and small sample sizes.

The purpose of this study is to act as a guide for those wishing to establish ‘exercise on prescription’ schemes prior to the availability of detailed evaluation. It draws upon the experiences of a scheme based in the North West of England that has been operative since 1993. The scheme is part of a wider programme, called the LIFE Project, of which the main aim is to reduce the incidence of CHD. The Project targets an area known as City Lands in Wirral which has a population of approximately 28 000, a standardized mortality ratio of 152 for CHD relative to the rest of Wirral, high unemployment rates (26.5%), high levels of deprivation (37.7 and 45.3 on the Jarman index for two of its constituent wards) and low car and telephone ownership (66% of households do not possess a car). The LIFE Project is funded by a local government initiative to work in the City Lands area. The ‘exercise on prescription’ scheme, however, is also currently partly funded by the Wirral Health Authority. In 1995, the LIFE Project was awarded first place in the Health Alliance Awards in the CHD/stroke category for good practice.

METHOD

Figure 1 indicates the stages through which the patient progresses during the scheme. The patient must first visit a GP. In many schemes it is the GP alone who identifies and selects the appropriate patients. In this scheme, however, the patient can be additionally identified through community screening or by self-selection. Self-selection occurs by responding to advertisements, notices in GP waiting rooms, or by word of mouth. Whichever selection procedure applies, the common element is that the recommendation must be given by the patient’s GP. Also, for medico-legal and safety reasons, strict criteria for patient selection are agreed with all GPs prior to referral. Current criteria include those identified as potential beneficiaries of exercise, aged over 18 years and with no contra-indications to exercise, such as severe CHD or unstable hypertension. Potential candidates include those at risk of CHD (e.g. overweight, smokers, family history of CHD, raised cholesterol, or suffering from stress), anxious or depressed patients, and selected individuals suffering from osteoporosis, arthritis and backpain. Table 1 shows the reasons for exercise prescription provided from a base of 200 randomly selected patients.

At the initial contact, the GP provides the patient with a leaflet detailing the scheme. This derives from the LIFE Project. The patient then arranges a consultation with the scheme’s coordinator at one of five local authority leisure venues, not private clubs, usually one convenient to the patient’s home. At this consultation, the coordinator, who is employed by the LIFE Project, conducts a short battery of physiological tests including total blood cholesterol, blood pressure, height, mass and aerobic capacity based on sub-maximal cycle ergometry. The patient also com-
pletes questionnaires on anxiety and depression, lifestyle, demographics, and previous medical history. All these aspects are considered when deciding upon the most appropriate form of physical activity to prescribe. The patient’s interests, time, transport availability and the cost are all discussed as part of the consultation.

Three activity sessions per week are recommended. They are normally one free activity per week at the chosen leisure venue, one activity per week at a leisure venue as a paying customer and one home- or club-based activity, such as cycling or brisk walking.

This programme continues for the first 6 weeks, after which the patient attends the second consultation with the coordinator of the scheme. During this consultation, the programme is reviewed, difficulties are discussed and further advice is provided. The patient then continues the programme for another 6 weeks, the main difference now being that attendance at leisure venues is on a fee-paying basis. The third and final consultation follows, at which the physiological and questionnaire assessments are repeated and the programme reviewed again. After this, the patient is expected to exercise independently of the scheme, but may still receive telephone calls or letters to maintain motivation and assess compliance.

FINDINGS AND IMPLICATIONS

The various guidelines and recommendations included in this section are based upon experiences and evaluation of the present study, and the relevant research literature. The list is by no means exhaustive and may not apply to all schemes. Thus, the various recommendations should be used as a catalyst for discussion and an example of good practice.

Evaluation

A comprehensive evaluation has taken place throughout the life of the scheme, examining both process and outcome [see Nutbeam et al. (1990) for a review of these techniques]. Typical examples of these studies include physiological, mental health, lifestyle, and medication changes, in addition to reasons for non-compliance, characteristics of adherers and non-adherers, and patients’ and GPs’ opinions. These studies form

<table>
<thead>
<tr>
<th>Table 1: Reasons for prescription (n = 200)</th>
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<tr>
<td>Reason for prescription</td>
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<tr>
<td>Reduce overweight</td>
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<td>Improve fitness</td>
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<tr>
<td>Decrease anxiety/depression</td>
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<tr>
<td>Aid arthritis</td>
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<td>Reduce blood pressure</td>
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<td>Aid backache</td>
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<td>Aid asthma</td>
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<td>Reduce blood cholesterol</td>
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<td>Underweight</td>
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Note: patients may have had more than one reason for referral. The percentages are derived from all indications for prescription.
the basis of separate reports unsuited to the present paper which concentrates on procedural guidelines.

Compliance

Although this report is substantially non-empirical, it is of interest to report certain findings which reflect procedural changes. The compliance rate (operationally defined as attending the pre- and post-12-week consultation) was only 20% for the first 2 years of the project. This figure has now increased to 56% as a result of improvements in operational structure. The changes, mentioned in more detail in the text below, were:

(i) provision of exercise classes specifically for the ‘exercise on prescription’ clients;
(ii) appreciation by leisure services staff of the needs of this clientele;
(iii) provision of exercise sessions for individuals with special needs (e.g. the obese);
(iv) provision of transport for those without vehicles;
(v) additional exercise sessions at times to suit the working day more conveniently; and
(vi) provision of sessions for couples, partners, friends and relations.

Entry criteria

The criteria for patient selection need to be determined before establishing the scheme. Those used in the present study were described in the Methods section above, but may need to be adapted to the country, location, ethnicity, or other special circumstances. Those with a medical history of CHD should be referred to an exercise unit with full medical cover (e.g. cardiac rehabilitation). Once the specific criteria have been devised, permission may need to be sought from an appropriate ethical committee.

Patient numbers

Prior to deciding the methods of recruitment and the involvement of general practices, the potential number of patients to be managed needs to be considered. This will be dependent upon the number of coordinators employed and the number of leisure classes available. When only small numbers can be accommodated, our experience shows that a few supportive GPs are preferable to many practices supplying a few patients each. When large numbers are desired, inter-collaboration with other health promotion schemes, such as wellman or well-woman clinics, may be necessary, together with appropriate advertising for patient self-selection.

Partner agencies

Once the numbers have been determined, the general practices and leisure venues may require targeting. Support cannot always be guaranteed, particularly from the GPs. Currently, the present scheme has 95% of targeted practices prescribing exercise, but this took several months to achieve. Direct face-to-face contact with GPs and presentations and literature should be provided. These highlight the benefits of exercise to the patients and the subsequent reduction in dependence on health care. In an evaluation investigating 30 of the participating GPs’ opinions, all believed that their patients had benefited from the scheme and that it should continue to be available. Asked if they were willing to contribute towards the cost of the scheme, 6.1% replied ‘yes’, 24.2% ‘no’, and 69.7% ‘possibly’. This last category was dependent upon whether they were a fundholding practice. We therefore recommend that new schemes explore the possibility of financial support from participating general practices. A further evaluation, useful for potential leisure managers, revealed that £772.70 was generated at local sports facilities from just 42 participating patients in 6 weeks. These figures only included entrance costs, which are substantially less than the total spend in the facilities. The additional spend is from vending, clothing, booking fees, etc. (Brodie et al., 1991).

Demographics

The demographics of the area should be well known before initiating a scheme. Evidence would suggest that areas of high unemployment and low socioeconomic background are the most ideal candidates for prescribing exercise. A strong link has been established between unemployment and prescribing costs per patient, not just for those unemployed, but for all patients (Pringle and Morton-Jones, 1994). This stems from evidence that both physical and mental ill health are associated with unemployment among those who are unemployed and their families, and those under threat of unemployment (Moser et al., 1984; Jackson and Warr, 1987). Pringle and Morton-Jones (1994) thus concluded that ‘it would be expedient to use employment data in determining resource allocation to and service planning in district health authorities and family health services authorities’. Further support for
prescribing exercise in areas of low socioeconomic level lie with the poorer physical activity levels observed in blue-collar workers and the unemployed (Stephens et al., 1985).

Factors which are commonly associated with deprived areas can promote difficulty in primary prevention. A typical example illustrated in the present scheme is the lack of transport. The 1991 census indicated that 66% of households did not possess a car (OPCS, 1991). Transport problems and poor facility convenience are two of the main reasons quoted for lack of adoption and adherence to physical activity (Gettman et al., 1983; Shephard, 1988). Jones et al. (1993) found that those who did not attend a health check attributed it to practical reasons such as unavailability of transport. In a comparison of adherers with non-adherers, the latter were significantly less likely to use a car as a means of transport to the activity (46.8 and 66.6% respectively), but instead relied upon other means, such as walking or taking a bus. Other schemes in areas of higher socioeconomic level may not experience the same difficulties. Furthermore, transport may not be such an issue in areas where the target population is in close proximity to leisure centres. We have resolved the situation to some extent by providing a minibus service free of charge to those living within a certain area. Although this increases the financial burden, we would recommend that other schemes adopt a similar procedure. Additionally, sessions should be prescribed as close as possible to the recipients home.

Another factor that should be considered when dealing with a deprived area is the availability of a household telephone. In a previous survey examining CHD risk factors in the local area, less than half of those screened provided a telephone number by which they could be contacted (Hammond et al., 1995). Evidence suggests that prompting is effective in increasing and maintaining physical activity in addition to other health behaviours (Kazdin, 1989). For example, weekly telephone calls to a home-based intervention have been found to enhance the adoption of physical activity and increased fitness levels (King et al., 1988). Acquista et al. (1988) found that telephone prompts increased adherence to a home-based physical activity programme. Thus, patients should be encouraged to provide a number, possibly a member of the family or a friend, simply so that they do not perceive themselves as forgotten. This is an important aspect of the coordinator’s work; coordinators will often require skills not just in the physical aspects of fitness instruction, but also in communicating with and motivating the participants. It is particularly important for those patients prescribed exercise to reduce anxiety and depression (11% of patients in the present scheme).

Location
The majority of the exercise sessions take place in leisure centres. For many patients, however, their perception of the leisure centre is of slim bodies and crowded changing rooms. There is no doubt that this perception reduces initial uptake and compliance, particularly among the overweight (Young and Ismail, 1977; Epstein et al., 1984); being overweight was the main reason for referral from the general practitioner (43%). It has been reported that subjects seem to prefer home-based, self-monitored programmes, rather than those conducted at leisure venues that are currently popular with prescribers (Ilfie et al., 1994). In the present study, leisure venues are the preferred initial location of activity for purposes of patient control, supervision and instruction. In addition, compliance rates were greater when patients attended a session collectively in relatively small numbers and with a member of the Life Project team conducting it. This provided a more social atmosphere and a person who could immediately attend to any difficulties. A typical quote supporting this supposition concluded ‘the exercise has made me more confident with everybody being in the same boat’. Where patients are prescribed exercise within the public domain, it must be strongly emphasized to those in contact with the patients that they are not the regular type of exercise participant. Instead, exercise may not have been experienced for years and motivation levels may be considerably lower. Thus, careful nurturing and full cooperation is required to achieve success. However, where large classes are involved, this may not always be practicable and so we would advise that smaller classes consisting of just those prescribed exercise be utilized. This would obviously prove more costly, but if compliance rates increased it could be considered worthwhile.

Exercise options
As well as the provision of small exercise classes, a variety of specific exercise options should be available which are also intrinsically interesting and appealing (Dishman et al., 1985; Lee and Owen, 1985). Where exercise is solely conducted for
health or cosmetic reasons, there is the potential of it becoming a dull chore. Skill development, a pleasant environment, opportunities for social contact and other rewarding components are all aspects of exercise that may reduce the dropout rate (Owen and Dwyer, 1988). The patient’s interests should therefore be discussed at the initial consultation and the exercise tailored appropriately. Furthermore, the practical aspects of the exercise programme should stem from the physiological profile of the patient. They should take into account not only initial fitness levels, but also biological age, social situation and medical limitations.

Exercise intensity
Based upon recent evidence indicating that moderate intensity exercise exerts a measurable level of benefit on both disease end-points and on physiological risk factors (Hardman, 1996), vigorous exercise should be prescribed in only exceptional circumstances. The reasons for this are twofold. Firstly, vigorous exercise carries more risks, such as orthopaedic injury and risk of sudden death (Willich et al., 1993). Second, the compliance with high-intensity exercise programmes is poor (Martin and Dubbert, 1982).

Social support
With few exceptions, social support (consisting of the family structure, marital status and encouragement from peers and spouse) has correlated positively with physical well-being and adherence to exercise programmes (Heinzelmann and Bagley, 1970; Zimmerman and Connor, 1988; Spink and Carron, 1992). An important source of motivation, particularly for exercise, is the active participation of a significant other (Sallis et al., 1989). Therefore, the adoption of and adherence to individual involvement in physical activity may be heavily influenced by peers or a spouse that exercises. In a review of participation in sports centres, ∼50% of users travelled to the centre with friends or family (Brodie et al., 1991). As a result of such evidence, we recommend the provision of sessions for couples, partners, friends and relations.

Handling non-compliance
In an examination of the reasons for non-compliance, patients were asked if they would like to rejoin the scheme. Seventy eight per cent of those that returned questionnaires replied positively, indicating that the majority of the reasons quoted for dropping out, such as ‘an injury or disability’ or ‘poor health’, were genuine. Thus, patients should be advised at the initial consultation about the processes of rejoining if they drop out prior to completion. Furthermore, those that do not comply should be identified as early as possible and the reasons for non-compliance explored. If the reasons are considered authentic and the patient would like to rejoin at a future time, this should be ensured. This will prove more cost effective, since any person who relapses can be considered to be a burden upon the funds. However, if this person subsequently rejoins, the resources initially used, such as screening consumables and time, are not wasted and are less than introducing a completely new patient.

Patient selection
It is more probable that patients who participate in the scheme as a result of their own initiative rather than that of their GP, will have higher compliance rates. Therefore, appropriate advertising techniques are required to inform patients of the opportunity available. We strongly recommend the use of posters in the surgery waiting room. Ward and Hawthorne (1994) have found that 82% of patients attending a GP’s surgery had noticed health promotion posters, and 95% had reported reading them. Furthermore, 53% stated that they would be interested in more information. Self-selection, however, rather than GP selection, may lead to those who are at lesser health risk becoming involved in the scheme. Evidence suggests that those who are in most need of intervention are least likely to accept health promotion initiatives (Griffiths et al., 1994). This is linked with Iliffe et al.’s (1994) concerns that resources may be misspent in attracting those who would have taken up exercise anyway [defined by Hart (1971) as the ‘worried-well’]. Consequently, there is a need for future research to concentrate on measuring the difference in risk factors and initial health condition between self-selectors and those selected by the GP, and also to examine compliance rates between the two groups. The most suitable method for patient selection to the scheme can then be determined with more certainty. Although in Stockport it was found that those attending the scheme had a range of medical conditions and were not the ‘worried-well’ (Green and Lord, 1994), these suggestions should still be heeded.
Gender

In the present study, 76% of those prescribed exercise were women and 24% were men. Unfortunately, with the main method of selection being via the GP, there is an immediate bias in the sex ratio of patients, due to women being more frequent attenders at surgeries. Research has also shown that women patients receive more comprehensible information than male patients (Hooper et al., 1982; Waitzkin, 1985). This difference has been associated with female patients requesting more information (Pendleton and Bochner, 1980). Furthermore, women have a greater social pressure to attain a beauty norm of fitness than men, which may explain their greater involvement. Studies have also found that women exercise for social reasons and fitness, whereas men treat sport as a challenge (Boothby et al., 1981). Men require targeting more intensively, particularly since they are considered at greater risk for heart disease than their female counterparts. Therefore, alternative strategies and advertising are required.

To conclude, Table 2 provides a summary of all the recommendations discussed above, together with additional relevant points from the literature.

DISCUSSION

As noted previously, ‘exercise on prescription’ is relatively unexplored and the potential for future study is considerable. A number of components associated with the scheme have already been examined. However, limitations currently include the relatively small base numbers and the timescale over which the evaluations were conducted. As in the majority of epidemiological work, the most conclusive studies are based upon large sample sizes and include randomized controls. The latter was recognized by Iliffe et al. (1994) as being an important evaluation component for ‘exercise on prescription’. However, there are some who argue against it being appropriate in community health promotion programmes. Firstly, it is often considered unethical to offer the opportunity to some but not others. Second, there are practical problems such as a lack of funding. Third, subjects will frequently be liable to influence from social friends or work colleagues who pass on information and literature which was part of the intervention. This has been referred to as ‘contamination’ (Nutbeam et al., 1990). Some studies examining exercise prescription have used the randomized control technique with proven success (McMurdo and Burnett, 1992; McMurdo and Rennie, 1993; McMurdo and Rennie, 1994), but a more collective base of information is necessary.

Without the use of a randomized control study, an in-depth comparison of all the current schemes, perhaps on the basis of a meta-analysis, should be conducted to coordinate and audit all the available research. Furthermore, a long-term analysis examining morbidity and mortality should rank as one of the most important evaluative aspects.

Table 2: Summary of recommendations

- Identify the demographics of the area and organize the scheme appropriately. This may include the provision of transport where unavailable or varying the costs in relation to the patient’s employment status.
- Inform all patients at the initial consultation about the process of rejoining if they drop out prior to completion.
- Identify those that do not adhere as early as possible and explore reasons for non-compliance. If considered genuine, provide a further exercise prescription.
- Prompt patients, perhaps through telephone calls, to maintain and increase health behaviours.
- Target light to moderate activity rather than high-intensity exercise initially.
- Maintain contact with all patients following completion of the scheme.
- Provide good quality self-help materials for those wishing to alter additional aspects of their lifestyle.
- Provide posters in the waiting room and seek additional advertising methods to attract more men.
- Explore further the possibility of funding from general practices.
- Utilize practice nurses as a form of referral and therefore reduce time costs with the general practitioner.
- Inform general practitioners about their patients’ progress.
- Provide creches for those with young children.
- Provide a variety of exercise options which are interesting and appealing and tailor the particular session to the patient’s interests, age, social situation and medical circumstances.
- Provide as many exercise sessions in which patients are the only participants.
- Cater for a range of patients by providing exercise sessions at different times.
- Maintain contact and thus motivation throughout the exercise prescription.
As well as evaluating whether ‘exercise on prescription’ is successful, we also need to determine the individual components that influence its success or failure. Future research could include studies examining the effect of transport provision on exercise adherence, a comparison of the adherence rates between the different forms of exercise prescribed and between the reasons for prescription, and the effect of home access to a telephone.

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REFERENCES

British Heart Foundation. (1996) GP advice on exercise is worth more than £1,000. General Practitioner, 12 July, 24.


