Review of International and National Exercise Referral Programmes

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Abstract

Physical activity and regular exercise play an important part in health and wellbeing. Many initiatives exist that aim to encourage people to increase their physical activity levels. One such initiative is the exercise referral scheme (ERS). Irelands ERS was first piloted in 2003 and was rolled out on a national scale in 2009 however it has not yet been evaluated. ERS exist in many countries worldwide which have reported varying rates of success. Those that have been shown to work best have key characteristics such as a thorough evaluation process, a wide range of health professionals as referrers, and a specific referral pathway for patients with chronic conditions. It is important that we consider these points in order to maximise the success of Irelands ERS.

Introduction

The WHO defines physical activity as “any bodily movement produced by skeletal muscles which results in the expenditure of energy and can include partaking in activities such as walking, cycling, dancing or playing a sport”.[1] A persons level of physical activity will impact on all aspects of their health depending on the frequency of activity, the intensity at which the activity is performed at, and the time spent performing the activity. The benefits of being physically active include reducing the risk of cardiovascular disease, diabetes, stroke, osteoporosis, certain cancers, as well as helping to control weight and contributing to mental well-being. Apart from the health benefits there are also social benefits associated with taking part in physical activities and exercise classes.[2] For older people regular physical activity reduces the risk of falls and resulting injuries. Despite the widely reported benefits of being active, the SLÀN 2007 survey reported that 46% of the Irish population were not meeting physical activity recommendations.[3] In an effort to increase levels of physical activity there have been many approaches both nationally and internationally including the creation of physical activity guidelines for Ireland and internationally by the WHO who released a report in 2010 providing physical activity guidelines entitled ‘Global Recommendations on Physical Activity for Health’.[4, 5] Other more hands on approaches include the implementation of exercise referral schemes which has occurred in Ireland. This review addresses the effectiveness of exercise referral schemes (ERS) in both Ireland and elsewhere and will be divided into 3 sections. First we will give an overview of the role of physical activity and levels of physical activity in Ireland. We will then go onto discuss ERS both in Ireland and elsewhere. Finally, there will be a discussion and recommendations based on the learning of existing evaluations of ERS.

Background

In the Irish National Survey of Lifestyles Attitudes and Nutrition (SLÁN 2007) physical activity was defined as a minimum of 20 minutes of exercise or playing sport 2-3 times per week, or

30 minutes of more general activities, like walking, cycling or dancing 4-5 times per week.[3] Just over half of respondents (55%) in the survey reported being physically active. 22% of respondents reported being physically inactive and of those, less than half (41%) were thinking about becoming physically active in the next 6 months. However more recently a report from the Irish Sports Council indicated that levels of physical activity had increased in 2009 and the number of people classified as being sedentary dropped from 18.2% in 2007 to 15.5% in 2009.[6]

The most recent research on physical activity levels in Irish adults was published in March of this year by the Irish Universities Nutrition Alliance (IUNA) as part of the National Adults Nutrition Survey. The survey determined activity by compiling data on the participants work activities and leisure time activities and segregating this data into the two categories of recreational activities and vigorous recreational activities. Table 1 shows the amount of time participants spent watching Television and partaking in recreational activity and vigorous recreational activity. Men in the younger age rang (18-35 years old) spent the most time partaking in vigorous recreational activity at 3 hours per week. Overall we can see that men spent approximately 3 times as much time being vigorously active than women at 0.9 hours per week versus 0.3 hours per week respectively. We can see from the table that Television viewing increased with age and the amount of time spent partaking in vigorous recreational activities peaks in both males and females in the years 18 to 35. The same is true for recreational activities which also decrease after the age of 35 with the exception of an increase at the age of 51 through to 64 after which time spent carrying out recreational activities decreases once again. The survey also reported that those who had a normal body mass index (BMI) spent less time watching television and more time performing vigorous activities than those who were overweight and had higher BMIs.[7]

Levels of sedentary behaviour and physical inactivity are also high in the UK with low levels of adults meeting the minimum recommendations for physical activity in adults at 40% and

28% in men and women respectively. [8] At an international level physical activity levels are also low with the WHO reporting in 2008 that approximately 31% of all adults globally were insufficiently active. [9] This illustrates the low level of importance people place on physical activity even though the benefits reaped from being physically active have long been proven.[10]

Table 1. Median amounts of time spent by participants watching television and participating in vigorous recreational activities.[7]

	18-64y	18-35y	36-50y	51-64y	≥65y
	Median				
Total (n=1224)					
Television viewing (hr/week)	18.0	18.0	17.5	18.5	21.0
Recreational activities (hr/week)	5.3	6.3	4.4	5.1	4.2
Vigorous recreational activities (hr/week)	0.6	1.6	0.2	0.0	0.0
Men (n=607)					
Television viewing (hr/week)	18.0	18.0	18.5	18.0	19.5
Recreational activities (hr/week)	6.9	8.5	5.6	5.8	4.6
Vigorous recreational activities (hr/week)	0.9	3.0	0.3	0.0	0.0
Women (n=617)					
Television viewing (hr/week)	17.5	18.0	16.0	18.8	23.8
Recreational activities (hr/week)	4.2	4.3	4.0	4.5	3.4
Vigorous recreational activities (hr/week)	0.3	0.8	0.1	0.0	0.0

Role of Physical Activity in Disease

The benefits of physical activity have been well documented.[11-13] However, levels of sedentarism and physical inactivity remain high throughout the world and it is estimated that physical inactivity can be attributed to approximately 21–25% of breast and colon cancer, 27% of diabetes and approximately 30% of ischaemic heart disease burden.[14] This is expected to progressively worsen with a recent report from the Institute of Public Health in Ireland predicting that the number of adults suffering from chronic conditions in Ireland shall increase by around 40% by the year 2020.[15] The major chronic diseases in Ireland are CHD, cancer, diabetes of which obesity plays a major role.

Chronic disease burden is apparent in Ireland where CVD is the main cause of mortality accounting for 36% of all deaths with approximately 10,000 people dying each year from

CVD. There is a high level of heart disease in Ireland also where the number of reported deaths caused by the disease being double the amount reported in other EU countries.[16] The incidence of cancer is also high. According to the findings by the Irish Cancer Registry the number of cancer cases in 2007 was 27,930 with prostate, breast and colorectal among the most common forms of the disease. Compared with other European countries Ireland has the second highest incidence of cancer after Hungary. [17] Diabetes is also high in Ireland. In 2010 the Institute of Public Health estimated that the prevalence of diabetes in the Irish population is 1 in every 20 people. This figure rises to 1 in every 8 people when the over 60 years old subgroup is examined. [15]

Although obesity is not considered a chronic disease it is a risk factor for the development of the major chronic diseases such as CVD, cancer and diabetes. In 2001 the North/South Ireland Food Consumption survey indicated that 39% of the adult population were overweight and 18% were obese.[18] In 2007 SLÁN reported that 38% of Irish people were overweight and 23% were obese. [10] More recently NANS reported that the prevalence of obesity and overweight adults in Ireland, aged 18-64 year old was 24% and 37% respectively. The report also illustrated that the risk of becoming overweight and/or obese increases with age and overall has increased significantly in the last two decades.[7] An increase in the numbers of obese people in Ireland is a trend which is emulated in most developed countries and increasingly in developing countries.

Several mechanisms have been proposed in relation to how physical activity confers health benefits. Physical activity helps to keep the body in a healthy energy balance. Weight gain is caused by the consumption of excess energy which is not expended and become stored by the body as fat. Regular exercise increases total daily energy expenditure so allowing the individual to consume more calories without the risk of gaining weight. Physical activity plays a salient part in the maintenance of a healthy energy balance which in turn reduces the risk of becoming overweight and/or obese. [19]

Another mechanism by which physical activity plays a role in the prevention of chronic disease is through its effect on biochemical parameters. At a biological level research shows that physical activity improves blood lipid profile by increasing High Density Lipoprotein Cholesterol (HDL-C) which is protective against developing chronic diseases such as CVD which includes coronary heart disease (CHD) and stroke. Physical activity has also been linked with reducing triglyceride levels in the blood thereby reducing the risk of CVD as having high triglyceride levels in the blood is associated with an increased risk of developing the disease. [20]

The risk of developing certain cancers has been associated with insulin-like growth factor (IGF-I). IGF-I influences normal cell proliferation, differentiation and apoptosis and inappropriate expression of this has been linked with the development of certain cancers.[21] Evidence suggests that physical activity and fitness level is associated with maintaining normal circulating levels of insulin-like growth factor (IGF-I) thereby reducing the risk of developing certain cancers such as lung and breast. Physical inactivity has also consistently been associated with the development of colon cancer.[22]

Physical inactivity is an independent risk factor for diabetes. Evidence has shown that physical activity has a favorable effect on insulin sensitivity which can reduce the risk of developing type II diabetes mellitus. [23] The beneficial effect of physical activity on diabetes risk are though in part to be due to its close association with obesity and obesity risk reduction as obesity is also a risk factor for diabetes.[24]

Physical activity also has an important role in bone health by helping to build bones, muscles and joints. Weight bearing exercises are associated with improved bone strength and have long been linked with the prevention and treatment of osteoporosis a disease of the bones which causes bone fragility and can lead to falls and fractures.[19] In accordance with this

physical inactivity has been shown to be a risk factor for the occurrence of hip fractures with studies reporting a 20 – 40% reduced incidence in individuals who reported being physically active than those who reported being sedentary.[25, 26]

While increased physical activity levels benefit all, there is strong evidence that the greatest health benefits occur when those who are least active become moderately active and while moderate activity is good, vigorous activity is better. Longevity is crucial in insuring the beneficial effects of being physically active at any level are enjoyed. Benefits will be greatly reduced or may be lost if the exercise is not sustained and therefore the aim of physical activity interventions should be to promote long term lifestyle behaviour change.[27]

Economic Benefit of Physical Activity

It is important not only to consider the health benefits gained from being physically active but also the effect increasing current levels of physical activity would have on the economic profile of the country. Physical inactivity contributes to the economic burden of ill health directly through health care costs and indirectly through loss of economic output due to illness and absenteeism, disease-related work disabilities or premature death. Physical inactivity is estimated to cost Ireland €1.6 billion per year. Based on two studies conducted in the United Kingdom and Switzerland a recent projection estimated that increasing physical activity levels of 10% of the Irish population could ultimately result in annual savings of between €67.5 – 135 million.[28]One UK study reported that physical inactivity was directly responsible for 3% of disability adjusted life years (DALYs) lost and that the estimated direct cost to the National Health Service was £1.06 billion.[29]

Physical Activity Guidelines

The obvious link between physical activity and health is becoming more evident in policies and guidelines both globally by the WHO, who in 2002 reported that increasing physical activity should be a public health policy objective and a medical recommendation[30], and more locally by the creation of National Guidelines for Physical Activity in Ireland.[31] In response to the growing obesity epidemic the National Taskforce on Obesity was established which included a report containing 93 guidelines aimed at tackling obesity in Ireland. Included in the report were measures that focussed on the importance of physical activity in the fight against obesity such as encouraging spontaneous increases in physical activity in adults and children through the development of better planning policies for urban/rural housing, transport, amenity spaces and workplace settings.[32]

Despite widely reported and established health benefits of partaking in regular exercise and physical activity Ireland is one of the only EU countries to have established national physical activity guidelines under the Get Active Ireland report. The Get Active Ireland report was created in order to increase physical activity levels in all ages and contains specific physical activity guidelines for each of three age groups, that is children and young people (aged 2-18), adults (aged 18-65) and those over the age of 65. Children and young people are recommended to be active for at least 60 minutes each day. This activity should be at a moderate to vigorous level, examples of moderate activities include brisk walking or physical education classes taken at school, and vigorous activities would include participating in classes such as karate. This age group should also be participating in activities that promote muscle-strengthening, flexibility and bone-strengthening at least 3 times a week.

Adults (aged 18-65) are recommended to take at least 30 minutes of moderate activity each day, 5 days a week. Examples of moderate activity include gardening and brisk walking, more vigorous aerobic activities include playing sports such as soccer or squash. Adults may

also accumulate minutes of activity in smaller bouts of time (minimum 10 minutes of physical activity each time) as long as the accumulation amounts to a total of 150 minutes a week. Adults, like children and younger people, should include 2-3 days in their weekly physical activities where they practice exercises that increase muscular strength and also that increase endurance. The guidelines for older people (aged 65+) are much the same as they are for adults i.e. at least 30 minutes of moderate intensity activity every day on five days a week, or an accumulation of 150 minutes a week. Elderly people are encouraged to focus more on aerobic activity, and to practice muscle-strengthening and balance exercises such as yoga and Tai chi 2-3 times a week as these would help reduce their risk of falls and fractures. The Irish physical activity guidelines also include recommendations for those with physical disabilities. The main aim is for individuals with disabilities to be active at a moderate intensity for at least 30 minutes on 5 days of the week which can be accumulated over periods of 10 minutes throughout the week which is the same for the rest of the adult population. Depending on the disability the individual should chose activities that they are capable of doing and in general they should aim to meet the guideline as much as possible. [31]

In July of this year new UK wide Physical Activity Guidelines were published as a joint collaboration of each of the chief medical officers in England, Wales, Scotland and Northern Ireland. This new report differs from past UK guidelines in that it includes recommendations for physical activity in children under the age of 5 years old.[33] The guidelines state that physical activity should be encouraged from birth through floor-based play and water-based activities, and recommend older children who can walk unaided to be physically active for at least 180 minutes on a daily basis.

Older children and teenagers aged 5-18 years old should aim to engage in moderate to vigorous physical activity for at least an hour daily. They should also aim to partake in activities which strengthen bone and muscle on at least three days of the week.

Adults ranging in age 19 to 64 years old are recommended to lead an active daily life with activities amounting to at least 150 minutes over the weekly period. This target may be accumulated in bouts of a minimum of 10 minute moderate intensity physical activity or through participating in vigorous intensity activities for 75 minutes on a weekly basis or through a combination of moderate and vigorous physical activity. Adults are also recommended to partake in activities which improve muscle strength on at least two days of the week. Adults who are aged 65 years or older should partake in moderate intensity activity on a daily basis and as above this activity should amount to at least 150 minutes over the week and can be accumulated in bouts of 10 minutes or more. Elderly adults who are currently active at moderate intensity can achieve adequate activity by increasing their activity intensity to vigorous for 75 minutes per week or by combining moderate and vigorous activities over the week.

Older adults should also undertake physical activity to improve muscle strength on at least two days a week. As some older adults may be at risk of falling the guidelines include a specific recommendation that they should practice physical activity that improves balance and co-ordination on at least two days of the week. It is recommended that all age groups from the under 5's through to the over 65's should minimise sedentary behaviour which is the first time such a recommendation has been included in UK Physical Activity Guidelines.

These new UK guidelines are similar to those outlined in the Get Ireland Active report. Adults have the same recommendations in both the UK and Irish guidelines i.e. 30 minutes of physical activity on 5 days of the week or the accumulation of 150 minutes over the week which is in agreement with guidelines set out by The Centre for Disease Control and Prevention and the American College of Sports Medicine that recommend adults to partake in at least 30 minutes of moderate physical activity on most days of the week, preferably all days. [34] In both reports older adults are advised to practice muscle-strengthening and

exercises that improve balance in order to prevent falls. The Irish guidelines begin to recommend physical activity from the age of 2 years old however the UK guidelines now include recommendations from birth with this and the absence of physical activity recommendations for those with physical disabilities being the main differences between the two reports.

Physical Activity Interventions

Three types of interventions that aim to promote physical activity have been identified by Kahn [35]these include informational approaches, behavioural and social approaches and exercise referral or exercise prescription schemes. Informational approaches provide the patient with sufficient knowledge in order to motivate them to become physically active. Behavioural and social approaches aim to increase physical activity often by using a health-promotion model. Exercise referral schemes aim to increase physical activity levels in the individuals by offering access to exercise facilities or exercise classes and activities. Exercise referral schemes are becoming increasingly popular following their endorsement by the National Institute for Health and Clinical Excellence (NICE) in 2006 who issued Public Health Intervention Guidance on physical activity, endorsing brief interventions for physical activity in primary care as being both clinically effective and cost-effective in the long term.[36]

Exercise Referral Schemes

NICE provides the following definition of exercise referral schemes; 'An exercise referral scheme directs someone to a service offering an assessment, development of a tailored physical activity programme, monitoring of progress and follow up. They involve participation by a number of professionals and may require the individual to go to an exercise facility such as a leisure centre.' The UK was one of the first countries to pioneer the exercise referral scheme in the early 1990's and since then there has been significant and sustained growth in the number of exercise referral schemes operating throughout the world. Individual schemes may differ slightly in the method in which they are delivered or in their inclusion/exclusion criteria. However there are fundamental basics that are common to all schemes. These include a pre-exercise assessment of patient, sign-posting to physical exercise and activities, supervision and guidance from trained health fitness professionals, monitoring of progress and an outcomes report following programme completion. Each patient must be willing to participate in the programme and provide consent. The overall aim of an ERS is to improve the general health and wellbeing of the participants by promoting and providing opportunities for increased physical activity. Many schemes will have additional aims such as providing opportunities for those with underlying medical conditions to become more active, or to promote long-term behaviour change. Referrals can be made by a range of health professional disciplines depending on the protocol of each individual ERS but may include community nurses, health visitors, dieticians, physiotherapists, mental health professionals, occupational therapists and specialist diabetes, asthma and epilepsy nurses. Firstly we will look at ERS in other countries primarily focussing on existing ERS in the UK and then in Ireland.

United Kingdom

The first exercise referral scheme was launched in the UK in the early 1990's. As of 2004, there were over 800 ERSs running in the UK. There is no standard model for ERS in the UK

and table 1 illustrates that individual ERS can differ from each other in many ways e.g. activities on offer by the leisure facility, duration of scheme, measurement of physical activity, follow up procedure. Although the ERS has been in place for many years in the UK it was only in 2001 that a National Quality Assurance Framework (NQAF) was published. This provided health professionals referring onto the scheme with guidance on correct referral protocol and allowed them to become more confident and familiar with the ERS process as well as distinguishing between recommending exercise and prescribing exercise.[37] Although the health professional referring onto the ERS varies with each scheme GPs are the most common source of referral at 94%. [38]

Many existing schemes have evolved through evaluation and a process of trial and error. Evaluation is a key concept in the effective delivery of an ERS. Each ERS should ideally be continually monitored and evaluated in order to ensure correct use of resources and efficient delivery of the scheme which should target those in most need of physical activity guidance.

England

Although there are many ERP in England only a small minority have been fully evaluated. The Camden ERP was established in 2004 and subsequently its first fourteen months of operation were evaluated by Middlesex University. The programme is of eight weeks duration and targets adults aged eighteen and over who suffer from at least one of the following chronic health conditions – obesity, diabetes, osteoporosis, coronary heart disease, cardiovascular disease, chronic obstructive pulmonary disease. Those suffering from a mental illness and older adults (at least 60 years of age), who are sedentary and at risk of losing their independence, may also be referred onto the scheme. Rates of programme completion were high and the main benefits reported from scheme completion included improved mental health such as positive mood. The evaluation illustrated that the accessibility and quality of the exercise facility was important to participants i.e. large enough and in good condition. Following completion participants were offered to continue with their

chosen classes or activities for a cost of £1 per session or for a cost of £16 a month they may become members of a local gym. The evaluation did not examine the long term physical activity levels of participants or whether participants maintained the same level of fitness that they had reached during the programme.[39]

Table 2. ERS throughout England

ERS	Referee	Patient	Duration	Scheme	Follow up	Cost/Session
Camden ERS	GPs, practice nurses, physiotherapists, mental health nurses and occupational therapists	Patients must be aged 18 or over and have at least one of the following conditions: CVD/ CHD,COPD, Diabetes, Neurotic and/or psychotic disorders, Obesity, Osteoporosis, Suffered a fall(s) and those aged sixty or older, who are sedentary and at risk of losing their independence.	8 weeks	Green gym, sports groups, yoga and Pilates. Or one-to-one sessions at home	At 9 months	Free
North-West England ERS	Primary care health professionals	Any sedentary adult or those with additional CHD risk factors	12 weeks	12 week leisure facility pass, information on non-leisure centre based activities	3, 6, 9, 12 month assessment	Reduced rate
Hailsham ERS	GP	Patients (smokers, hypertensive or overweight)	10 weeks	20, half price sessions at a leisure centre.	Blood pressure and anthropometric measures were taken at 16, 26, and 37 weeks	£1.30
Norfolk and Norwich ERS: Benefit Health and Fitness	GP, Practice nurse, Health Care Professional	Patient with any medical condition that would be relieved/improved by regular controlled exercise only if the condition is treated, stable, and past the acute phase	12 weeks	Leisure facility use, classes e.g. circuits		Price varies £2.50 - £3.50
Cambridge ERS	Doctor, nurse, occupational therapists, physiotherapist, dieticians, or other health professional.	Inactive adults with a medical condition, disease or disability whose health would benefit from being more active.	12 weeks	Leisure facility use, classes, weight management sessions, booklet advising on exercise at home	Patient invited to continue exercising at a similar rate and have further reassessments (at a cost). Staff are available for advice following scheme completion	Price varies with class taken e.g. Pilates £3
Tunbridge Wells ERP	GPs, Nurses, other health professionals	Patients with stable physical limitations related to chronic disease or disability, depression or mild anxiety	10 weeks	Exercise sessions at the same time each week at a sports centre	10 weeks, 6, 12 months assessment. At programme completion patient is guided towards a range of activities provided locally	£2.10

Wales

In 2007 the Welsh Assembly Government established the National Exercise Referral Scheme (NERS). The NERS uses a national protocol which was developed using good practice found in existing local ERS throughout Wales. Subsequently the Welsh Assembly Government commissioned an independent evaluation of the NERS which aimed to assess scheme effectiveness and implementation. The evaluation assessed scheme implementation by focusing on a number of key areas; programme diffusion, programme fidelity and dose delivered, patient experience and programme reach and adherence. Methods used to collect this information included semi-structured interviews with policy representatives, exercise professionals and patients, focus groups with general practice staff, and recording of first consultations to monitor motivational interviewing fidelity. In order to evaluate the effectiveness of the NERS a randomized control trial (RCT) was carried out which involved twelve of the local health boards in Wales. Participants were recruited opportunistically during routine primary care consultations with their GP or practice nurse having been referred with CHD risk factors and/or minor mental health complaints i.e. anxiety, depression. A total of 2160 participants were randomly allocated to either the intervention arm or the control arm of the RCT. The intervention group received immediate access onto the ERS which was 16 weeks duration and were compared to the control group who initially received a physical activity advice booklet and 12 months later were given the option of participating in the ERS.

The results of the RCT showed that the intervention group had higher physical activity than the control group however this was only statistically significant in patients referred for CHD risk factors, odds ratio 1.29 (95% Confidence Intervals: 1.04, 1.60). Results also illustrated that those who remained in the programme for the full 16 week duration had statistically significantly greater increases in physical activity compared to those who participated partially, intermittently or not at all. Results of scheme implementation analysis showed that

the NERS was widely accepted as being an improvement on previous practice. The early appointment of national and local coordinators to implement the scheme was identified as being crucial to successful scheme implementation and improved communication which was reported to be lacking during the initial implementation period by the local coordinators and policy representatives. Fidelity to the scheme i.e. complying with scheme protocol, varied according to the different areas. Follow-up is thought to have played a role in this as a third of non-attendees contacted at 4 weeks returned to the scheme.

As we can see from table 3 the Welsh NERS consisted of one on one exercise or group classes over a 16 week period for patients who were sedentary and also suffering from problems in at least one of the following categories, Musculoskeletal, Respiratory/pulmonary, Neurological, CHD risk factors, or those with mental health issues. The evaluation found that areas with the highest levels of scheme fidelity i.e. full participation and compliance with scheme protocol, also had the highest rates of scheme completion and those areas achieving the lowest fidelity also had the lowest rates of scheme completion. Scheme adherence analysis showed that drop out was most likely to occur between scheme entry point and at the4 week mark. Professionals reported that participants who initiated the referral decision themselves as opposed to acting on GP advice were more likely to adhere to the scheme. Higher levels of adherence were also found in participants who were less disadvantaged and in those who were not referred for mental health reasons.

The evaluation also included detailed cost effectiveness analysis using the quality adjusted life year (QALY) as the outcome measure. Information on costs such as set up and operating costs was gathered from the Welsh Assembly Government, local authorities, leisure centres using semi-structured telephone interviews. Results from the cost effectiveness analysis show that the mean cost per participant in NERS was £385. ERS cost per QALY was £12,111 (bootstrapped one-sided CI £58,881). This figure is based on the assumption that referral onto the ERS occurred opportunistically at a routine GP visit and

that the exercise classes were provided free of charge. A willingness to pay questionnaire was completed by some of the participants indicating that they would be willing to pay a mean fee of £2.27 per exercise session. If the exercise classes were provided at a cost of £2 per session the NERS cost would be less than £10,000 per QALY. Taking the NICE guidance on cost-effectiveness into consideration both ERS cost per QALY figures i.e £12,111 and £10,000 are well below the threshold of £20,000 to £30,000 per QALY and so the scheme can therefore be considered cost-effective.[40]As health outcomes were not part of the evaluation it is not possible to comment on how the ERS impacted on these.

Scotland

The Live Active Exercise Referral Scheme, previously known as the GP Exercise Referral Scheme is Scotlands biggest ERS and has been in place in Glasgow since 1997. Initially implemented as a pilot scheme in 1997, it has been evaluated by the Greater Glasgow National Health Service Board in 2002. The evaluation included surveys and focus groups with patients and physical activity counselors. Health professionals that are able to refer onto the scheme include GPs, practice nurses, physiotherapists, cardiac rehabilitation physiotherapists and cardiologists. The scheme offers two different types of referral low risk referral and high risk referral. Low risk referral is suitable for patients who would benefit from increasing physical activity but who are free from CHD. High risk referral is specifically for patients with established CHD depending on whether or not the patient has successfully completed their Phase III cardiac rehabilitation programme. Before a CHD patient is referred onto the scheme they are instructed to take an exercise tolerance test (ETT) at a local hospital cardiology unit. The cardiologist will take the final decision on whether or not the patient is suitable for the programme. The scheme lasts 12 months and involves different methods of becoming physically active depending on the preference of the individual participant i.e. they may chose to exercise at home, at a leisure centre which they will receive access to at a reduced cost or those with established CHD can attend specific classes run by the British Association of Cardiac Rehabilitation. Each participant was

followed up at 3 month intervals over the course of the 12 months during which baseline information was revisited and rerecorded.

Evaluation analysis of patient characteristics showed that those most likely to complete the programme were in the high risk referral group, older, non-smokers, at a more advanced stage of change, had lower anxiety and depression rating, were male, had lower systolic blood pressure and had entered the programme in the latter part of its existence. The evaluation did not analyze specific health outcomes for each of the high risk referral and low risk referral groups however it did report that although 96% of the patients were classified as low risk referrals these were found to be less likely than those referred as high risk to remain in the scheme for the full 12 month duration. The evaluation also reported that appointments made by GPs were more likely to be kept than those made by the participant themselves indicating the important role GPs and other referring health professionals have in the appointment setting process.

The evaluation illustrated that physical activity did increase in all scheme participants with the main increases in the amount of time spent partaking in physical activity occurring between baseline and the 3 month point. Patients who remained in the programme past baseline showed a reduction in systolic blood pressure however only those who remained in the programme for at least 6 months showed reductions in diastolic blood pressure. Participants who completed the full 12 months duration showed a significant reduction in both systolic and diastolic blood pressure and resting heart rate. A reported reduction in depression and anxiety was observed with levels decreasing further with programme duration. Other positive aspects of the scheme reported by patients included the social interaction with other participants and an improved self-perceived level of health.

Northern Ireland

In Northern Ireland the ERS is managed by local physical activity coordinators and leisure services within local councils. A report published in 2008 by the Health Promotion Agency in Northern Ireland illustrated the characteristics of existing ERS in Northern Ireland. [41]The report showed that those referring onto the scheme include GPs, practice nurses, physiotherapists, and cardiac rehabilitation nurses. GPs make most of the referrals with 92% of GPs reporting that they refer onto the scheme. A total of 54% of practices in Northern Ireland reported that they actively use the referral scheme as a means to promote physical activity. The duration of the programme is between 8 and 12 weeks depending on the individuals leisure centre involved. Schemes are generally offered free of charge and following programme completion participants are offered a reduced rate membership at the leisure centre. Patients can be referred onto the scheme for a variety of health reasons such as overweight, Diabetes, CHD risk factors, and/or from depression, anxiety or stress. There has as of yet been no formal evaluation of the scheme effectiveness or impact on health outcomes.

Table 3. ERS in Scotland, Wales and Northern Ireland

ERS	Referee	Patient	Duration	Scheme	Follow up	Cost/Session
Wales ERS	Health professionals	Sedentary adults with at least one of the following conditions: CHD risk factor Mental health Musculoskeletal Respiratory/pulmonary Neurological	16 weeks	One on one exercise or group classes	8 month follow up via telephone to check progress. 12 month review is offered to all patients.	£1
Scotland ERS	GP, Practice nurse, Physiotherapist	Low risk referral: Free from CHD and would benefit from physical activity High risk referral: Established CHD, or who have completed Phase III cardiac rehabilitation programme	12 months	Leisure Centre facility use, classes, support/advice on home-based activity	3, 6, 9, 12 months	Reduced rate
Northern Ireland ERS	GPs, practice nurses, physiotherapists, cardiac rehab nurses, other health	Patients with, BMI >25 Diabetes Risk of CHD Depression Hypertension	8 – 12 weeks	Gym based exercise, swimming, class activities and lead walks	Leisure centre may offer a subsidized membership following	Free

	professionals	Anxiety and stress			scheme completion	

As we can see from Table 2 and Table 3, ERS in the UK are similar in many ways to the current ERS in Ireland in such areas as intervention process. However, within the UK a wider range of health professionals are involved in the referral procedure. Also the patients that the scheme is aimed at in the UK is greater than that in Ireland in particular those suffering from chronic conditions such as CHD are able to participate in the UK ERS but not in the Irish ERS.

New Zealand

In New Zealand patients identified as being in need of more physical activity following a consultation are issued with physical activity recommendations written by their GP or practice nurse known as a “Green Prescription”. The Green Prescription primary healthcare programme has been in place in New Zealand since 1998 and aims to encourage the patient to become more physically active. The prescription itself provides the patient with written advice on how to become more physically active and includes both exercise and lifestyle goals and can contain detailed information on frequency and duration of exercise as recommended by the health professional. If the patient decides that they would like ongoing support then their prescription can be faxed through to what is known as a Green Prescription Patient Support Person working at one of Regional Sport Trusts. This person will provide the participant with support through monthly telephone calls for 3-4 months, face to face meetings for 3-4 months or group support in a community setting for 3-6 months. The Regional Sport Trust also sends out a quarterly newsletter with information on physical activity initiatives that may be of interest to the patient. The programme offers free and low cost opportunities to become physically active such as aqua-aerobics classes, gym workouts as well as educational workshops. If the patient feels they require further support after the duration of the programme then they can ask their health professional who referred them in the first instance for another prescription.

The scheme claims to be able to help patients with conditions associated with physical inactivity i.e. risk factors such as hypertension, high cholesterol as well as chronic diseases such as diabetes, depression and anxiety and/or arthritis. Patients who are excluded from entering in the programme include those with unstable medical conditions, for example a recent myocardial infarction.

Since 2004 the Green Prescription programme was extended to include children and adolescents aged between 5 to 18 years old. This extension of the Green Prescription was named Active Families and aimed to target both children and their families in recognition that children are heavily influenced by their familial environment. Active Families includes personalised physical activity programmes for each participant over a 6-12 month period including nutritional advice and support from a dietician. It is estimated that around 50% of GPs in New Zealand are now using the Green Prescription.

Many trials have been conducted on the effectiveness of the Green Prescription method in increasing physical activity and overall health in participants. In one particular effectiveness study patients were recruited opportunistically during standard GP visits and participation criteria included being sedentary and in the age group 40-79 years old. The study randomly allocated participants into the intervention or control group which entailed receiving the Green Prescription or usual care for the 12 month study duration, respectively. The study found that there was an increase in the number of participants in the intervention achieving 2.5 hours of moderate-vigorous physical activity each week by 14.6% which is approximately 3 times greater than what was observed in the control group. The study also showed increases in physical activity of at least 150 minutes of moderate or vigorous activity in the intervention group over a 12 month period from 18% to 33%.[42] Although this study shows that the Green Prescription is effective in increasing physical activity and numbers of people

partaking in physical activity we cannot comment fully the programme as no full evaluation has been carried out.

Australia

The Australian equivalent of an ERS is known as Exercise is Medicine. Exercise is Medicine is aimed at medical practitioners, practice nurses and allied health professionals and provides the resources necessary to facilitate and encourage the incorporation of physical assessment as a component of every patient visit. In 2007, the American College of Sports Medicine (ACSM) launched the Exercise is Medicine programme in the United States of America. In 2011 Exercise & Sports Science Australia (ESSA) announced that they were to adapt and initiate the programme in Australia. Exercise is Medicine has three guiding principles; that physical activity and exercise are important to health and the prevention and treatment of many chronic diseases, supporting the prescription of physical activity and exercise in health care settings, and supporting the referral of patients to appropriately trained allied health professionals to deliver exercise treatment services.[43] The scheme offers health professionals training and tools necessary for effective referral process such as a referral form which details the physical activity recommendations as decided upon by the referrer. The recommendations include information on the type of physical activity, frequency of physical activity per day and week and whether the type of activity is aerobic or strength based. Patients with chronic conditions are also allowed to use the scheme by using the 'Your Prescription for Health' document which provides the referrer with information and recommendations for prescribing exercise in a safe way to those suffering from for example, arthritis, osteoporosis or those who have had a stroke or coronary artery bypass surgery. The patient is asked to complete a Physical Activity Readiness Questionnaire which includes a number of questions on different topics including the use of medicine to control blood pressure or a heart condition or the presence of chest pain during exercise.[43] Although this ERS has been in place for several years there has been no formal evaluation of the scheme.

United States of America

As previously mentioned the American College of Sports Medicine (ACSM) launched Exercise is Medicine an exercise referral programme in the United States of America (USA) in 2007.[43] Medical practitioners, practice nurses and allied health professionals are targeted by the programme and encouraged to begin incorporating physical activity advice into each patient consultation. Exercise is Medicine aims to promote and increase exercise assessment of patients however it is an initiative and not an existing ERS that has been implicated or rolled out at a national level. There is currently no nationwide scheme on exercise referral in existence in the USA.

One example of a programme that is similar to an ERS in existence in the USA is The Chicago Exercise Prescription Fitness Center Waiver which was launched in 2003. Patients who have been diagnosed by their GP or physician as having any obesity-related disease or cardiovascular-related disease for example high blood pressure, hypercholesterolemia, diabetes, and prescribed exercise as treatment can avail of a free gym membership pass at one of the Chicago Park District fitness centres. Through offering free membership the program aims to eliminate cost issues as a reason for not partaking in physical activity and to incentivise referrals from physicians. There has been no evaluation of such initiatives and no evaluation of the effectiveness of prescribing physical activity as medicine in the USA.

Exercise Referral Programme: Ireland

Between the years of 2003 and 2008 an exercise referral programme (ERP), as it is known in Ireland, was piloted in Cork, Kerry, Limerick and in the Midlands. This led to the development of a national protocol in 2009 based on the best practice taken from the pilots. The Exercise Referral Programme (ERP) is aimed at adults over the age of 18 years who are physically inactive, are interested in becoming more physically active or those who suffer from chronic conditions and would benefit from physical activity. Individuals who have cardiac conditions such as coronary heart disease or who suffer from uncontrolled conditions

may not participate in the ERP. Of 12 weeks duration, the programme aims to gradually increase activity levels in a way that is tailored to the individuals exercise preferences and life/work habits, whilst also instilling the participant with the motivation and confidence required for sustained healthy physical activity levels on programme exit. The programme also provides healthy eating advice, healthy lifestyle advice and information on any local sports partnership. Each ERP is run by Local Coordinators, normally health and fitness instructors, who have completed the HSE Exercise Referral National Training Course, and who have subsequently been awarded a Local Coordinator certificate which is compulsory for any facility that wish to deliver the programme. The ERP takes place at leisure facilities and community centres throughout the Republic of Ireland. There are 29 facilities in total which offer the programme that includes 7 in the greater Dublin area. The Midlands and Southern parts of the country are covered quite well by the scheme, however counties Mayo, Leitrim, Sligo, Cavan and Longford do not have any leisure facilities/community centres offering the programme. As of November 2010 there were 39 Local Coordinators delivering the programme nationally. The cost of participating in an ERP is dependent on the leisure facility/community centre i.e. centre may offer a pay-as-you-go rate or a 3-month membership at a discounted rate.

Subsequent to referring patients onto the ERP GP's must register to use the service. They will initially be sent out a pack outlining procedures and protocol and further to them completing registration they will receive a referral form pad. Patients may be recruited onto the programme via recommendation by their GP or they themselves may request to be placed on the programme. However it is the GP who makes the final decision on whether or not the patient is suitable for the ERP and whether it would be beneficial for them to participate. If the patient is deemed to be suitable then they are asked to fill out the referral form along with their GP, once completed the form will be sent to the local coordinator who contacts the participant to arrange the first appointment. The programme itself comprises three different assessment stages initial assessment, mid-way assessment and final

assessment. The initial assessment usually takes place at the leisure facility at which the participant has the opportunity to become familiar with the staff and the facility. Baseline data is collected at this stage and medical records are checked. The local coordinator and the participant agree and set goals. The participant also receives an activity pack and an appointment card at this stage. Exercise sessions are planned to suit the participant's preferences i.e. walking, cycling and can be home based, community based such as a class in the local community centre or facility based where the participant can be shown how to use gym equipment. At the mid-way assessment goals are revisited and sessions can be re-planned if necessary. The final assessment takes place at programme completion and the participant will receive a certificate, progress is reviewed, baseline data is re-collected and goals are set for the future. Following completion of the programme an individual patient feedback report is sent to the GP which should include any recommendations made by the local coordinator. On programme exit the patient will be followed-up 3, 6, 12, 24 months later. Throughout the programme there is strong focus on continuing support to facilitate and encourage the participant to sustain any healthy changes that they have made. To date no evaluation has been carried out on the ERP in Ireland.

Section 4.

Discussion

ERS are increasingly becoming more popular across the world as a method of increasing physical activity among sedentary adults and those suffering from chronic disease and chronic disease risk factors. It is difficult to comment on the efficacy of the ERS as many have not been fully evaluated. Evaluation is an important part of any ERS as it helps to ensure resources such as time, and money are used efficiently and are not wasted. Irelands ERS has not yet been fully evaluated but there are lessons we can learn from other ERS that have been evaluated in other countries which we may apply to Ireland.

In the UK there is no standard model for an ERS so schemes may recruit patients as young as 16 years old. In 2004 New Zealand's Green prescription programme began to allow participation from 5 to 18 year olds. In Ireland the minimum age of participation is older than this at 18 years old. Chronic diseases are not likely to be present in the teenage years however encouraging physical activity in this age group is important and may play a crucial role in the prevention and development of chronic diseases such as obesity, CVD, diabetes later in life. Although the ERS is open to participation from teenagers evidence shows that those most likely to be referred onto an ERS in England are males ranging in age from 55-64 years old, followed by females of the same age. [44] The benefits of participating in an ERS at the age of 16 years old was not studied in any of the UK ERS however encouraging more recruitment of young adults may be worthwhile as the rates of childhood and adolescent obesity continue to rise.

The referrer plays an important role in an ERS. In Ireland only GP's refer patients onto an ERS. When compared to other existing ERS in other countries we can see that a large number of different health professionals are able to refer patients onto the scheme. In the UK health professionals able to refer onto the ERS includes GPs, practice nurses, physiotherapists, mental health nurses, occupational therapists, dieticians. The Exercise is Medicine initiative implemented in the USA and in Australia is aimed at also aimed at a wide variety of health professionals including medical practitioners and practice nurses. The inclusion of these varied health professionals as referrers allows for a much greater opportunity to include patients with different needs and health issues all of which would benefit from increasing physical activity levels and participation in the scheme. The Camden ERP evaluation showed that the main benefits found from scheme participation were improved mental health status. These reported benefits to mental health may be because of the presence of a mental health nurse as one of the referrers onto the scheme although this was not examined in the evaluation. In Wales, Scotland and Northern Ireland many different health professionals are also able to refer onto the ERS.

The evaluation of the Glaswegian ERS demonstrated that participants were more likely to keep appointments made for them by their referring health professional which in this scheme happened to be their GP. The evaluation suggested that referrers should be encouraged to make more appointments for their patient as it reported that patients felt more obliged to keep appointments booked by their GP when compared to appointments they had booked themselves. This illustrates the crucial role referrers have in insuring that participants adhere to the scheme.

Patient profiling is an important part of the referral process. In the initial assessment of any ERS the patient is asked detailed questions on subjects such as medical history, current exercise habits, and goals they wish to achieve. In Scotland the Glaswegian ERS as previously mentioned has two patient referral categories low risk and high risk referral. Patients in the high risk referral category suffer from or have suffered from CHD. The Glaswegian ERS evaluation showed that those who benefitted most from participating in the scheme were in the high risk referral group. This group was also more likely to remain in the programme for its full 12 month duration. The reason for this was not stipulated in the evaluation however it is possible to argue that those patients who have had CHD may realise the seriousness of their condition and the benefit to their health which may be reaped from becoming more physically active. The Exercise is Medicine initiative also provides referrers with the option of referring patients suffering from or who have previously suffered from chronic conditions. The Irish ERS does not allow participation from anybody suffering from CHD or those who have an uncontrolled condition such as hypertension and the segregation of referrals is not current practice where all patients are referred in the same way. It may be worthwhile considering this method of referral as well as the provision of information to the referrers which would allow them to prescribe physical activity in a safe way to patients suffering from chronic conditions.

The duration of schemes vary across countries and within countries in different locations. Within the UK Wales has the longest ERS at 16 weeks duration. The greatest benefit in patients was observed in those who remained in the schemes past baseline it is therefore important that every measure is taken to ensure participants remain in the scheme and attend all appointments. Methods of ensuring scheme adherence include minimising the time delay between being referred and attending their initial assessment by an exercise professional, The Camden ERS evaluation reported that such time delays lead to reduced motivation in the patients and ultimately patient drop-out. In New Zealand where the Green Prescription method is used the participant may remain in the scheme for up to 6 months and following this, if they wish they can receive another prescription. There is a high level of support offered by the Green Prescription through telephone calls, face to face meetings and/or group support meetings. This level of support may be responsible for its reported success in increasing participants' physical activity levels by up to 3 times as much as those who did not participate in the Green Prescription and who received normal care.

Conclusion

The Irish ERS is well established however we do not yet know the full impact of the scheme or the effect it may be having on physical activity levels as there has been no full evaluation. There are three different assessment stages involved in the Irish ERS and follow up occurs at 3, 6, 12 and 24 months and so the information required to analyse and evaluate the scheme should be readily available. Many existing ERS have evolved through a process of trial and error through implementing pilot schemes and the existence of an effective monitoring and evaluation process. From our research we can see that there are important lessons which we can learn from these schemes these include; expanding our referrers from GP only to include a wider range of health professionals which may include practice nurses and physiotherapists, allowing patients suffering from chronic conditions to be referred onto the scheme including patients with cardiac conditions or any uncontrollable conditions and

developing a specific referral pathway for these patients. A full evaluation of the Irish ERS should be undertaken as early as possible and this should include the set up of a continual monitoring system. This will allow us to determine the effectiveness of the ERS in Ireland in increasing levels of physical activity in the short, medium and long term as well as evaluating health outcomes.

Recommendations

- A full evaluation of the Irish ERS should be undertaken in order to determine the impact of the scheme on physical activity. This should include a full economic analysis of the scheme from a health economy perspective.
- The trial of effectiveness on the Green Prescription initiative in New Zealand took place over a 12 month period and showed a number of beneficial outcomes. Therefore it is important that the evaluation of the Irish ERS takes place after the initial scheme is implemented and that sufficient time is allowed for outcomes to be observed.
- Consider whether the ERS could be expanded to include participation of those suffering from a chronic disease such as CHD. The inclusion of other subgroups of society that may benefit from participation in the scheme should also be considered such as women planning to become pregnant and who are currently overweight and/or obese.
- It is important that the ERS in Ireland is promoted to both health professionals and patients to make them more aware of its existence. Increasing awareness of the scheme could potentially increase interest and uptake.
- The scheme should aim to move as many patients as possible past the baseline stage as, based on data from other schemes, those who remained in schemes beyond this point showed the greatest benefit.
- Adequate training and support should be provided to health professionals involved in the referral process. In one evaluation two days of training was deemed as necessary in order to acquire the knowledge, skills and confidence that referrers need to deliver the care pathway.

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