Introduction

***Dr Andrew Scott**, University of Portsmouth, UK.*

***Dr Paul Gorczynski**, University of Portsmouth, UK.*

***Professor David Broom**, Coventry University, UK.*

Chapter Aims

The aims of this chapter are to:

- Provide an introduction to the book
- Provide the rationale of physical activity for public health guidance
- Introduce the concept of Exercise Referral Schemes
- Introduce the role of the Exercise Referral Practitioner and its international counterparts
- Guidance on the layout of the chapters and how to use these
- Provide an online resources section for further training

Introduction

The aim of this chapter is to introduce the reader to the field of Exercise Referral, with the aim of supporting the development of the reader into an Exercise Referral Practitioner and for the book to be used as an occupation-long resource. The book is written largely from the UK context but can be applied to any setting where the health and fitness sectors might work within a similar space. The book has been written in a style to provide contemporary information on exercise for health conditions, where evidence suggests that exercise might prove beneficial for supporting the management of these conditions and contributing to enhanced quality of life. There is therefore a practitioner focus of the chapters rather than solely reporting data from laboratory studies and importantly there are four chapters that are focused on the soft skills of engaging

sedentary individuals in becoming more physically active using evidence-based research and the professional experiences of the authors.

Physical activity for public health

Physical activity is essential for the promotion of good health, including improving both physical and mental health, physical activity has also been shown to improve social health or the way we stay connected with others (Kokkinos, 2012; Lee et al., 2012; McKinney et al., 2016; Warburton et al., 2006). Many rigorous studies, from all around the world, examining diverse populations have consistently shown that regularly engaging in physical activity is, quite simply, good for us. Yet despite this consistent evidence of physical activity benefits, and the pleas of public health researchers and practitioners, many people remain inactive and do not achieve weekly recommended amounts of physical activity (NHS Digital, 2020). There are a lot of complex individual and environmental determinants as to why people do not engage in regular physical activity. By better understanding individuals and their social contexts, the more likely that behaviour change interventions, like exercise referral schemes (ERS), can be employed to successfully help people become active and ultimately improve their health.

Physical Activity Guidelines

For adults between the ages of 19 and 64 years, the United Kingdom Physical Activity Guidelines (UK Chief Medical Officers, 2019) recommend that to achieve good health, individuals should aim to be active, on a daily basis. Specifically, over the course of one week, individuals should accumulate 150 minutes of moderate intensity physical activity. Activities of

moderate intensity have an energy cost of 3 to 6 metabolic equivalents (METs) that often produce a noticeable increase in heart rate, respiration rate and perspiration. Examples of moderate intensity physical activity includes brisk walking, gardening and housework (Ainsworth et al, 2011). Alternatively, individuals may also reach recommended levels of aerobic activity by accumulating 75 minutes of vigorous intensity activity. Vigorous intensity activities have an energy cost of greater than 6 METs and require large amounts of effort which cause rapid breathing and a substantial increase in heart rate. Examples of vigorous intensity activities include running, fast cycling, aerobics, fast swimming, and heavy shovelling (World Health Organisation [WHO], 2011). In addition to aerobic activity, individuals should perform strength training exercises at least two days per week. Strength training should be done using one's own body weight or using some form of resistance and involve all major muscle groups. Some examples of strength training includes exercise with weights, calisthenics, or simply carrying or moving heavy objects like boxes or groceries. Lastly, the physical activity guidelines suggest individuals minimise time spent being sedentary. This includes time spent sitting and watching television, reading or using the computer. It is recommended individuals break up sedentary time by taking regular activity breaks or, when possible, substitute sedentary activities with more active options, such as undertaking active travel such as walking or cycling instead of driving.

Exercise Referral Schemes

Given that many individuals in the UK are not aware of current physical activity guidelines, nor meeting recommended levels of moderate to vigorous intensity physical activity (MVPA), ERS' were implemented by the National Institute for Health and Care Excellence (NICE) to help

individuals, especially those who were inactive and had existing health conditions or other factors that increased their risk of ill health, to become active (NICE, 2014). An exercise referral scheme consists of the following components:

- An assessment by a primary care or allied health care professional to determine that an individual is sedentary or inactive and not meeting the physical activity guidelines.
- A referral by a primary care or allied health care professional to see a physical activity specialist or service.
- An assessment by a physical activity specialist or service to determine the best physical activity programme that meets the needs of the individual.
- The opportunity to participate in a physical activity programme.

Physical Activity may be differentiated from exercise and often an ERS may be referred to as a physical activity referral scheme (PARS) to reflect the emphasis of encouraging not only supervised/structured exercise in a leisure centre setting but also self-directed everyday activities which may be better integrated into an individual's daily routines (e.g. active modes of transport). A common understanding of physical activity is that it refers to any movement of the body that results in energy expenditure above that of resting level (Caspersen, Powell, & Christenson, 1985). For the purpose of this chapter, it is acknowledged that exercise refers to a component of PA that is more structured and purposefully undertaken (e.g. gym attendance, jogging, or attending an exercise class) though the reader is directed to Winter and Fowler (2009) for wider discussion on the definition of exercise.

The NICE guidelines state that physical activity programmes should be designed on established behaviour change models and theories and be evidenced based (NICE, 2014). These ERS follow

a developed framework and usually take place in public leisure centres (Department of Health (DOH), 2001; Williams, Hendry, France, Lewis, & Wilkinson, 2007). They are reportedly cost effective for individuals with multiple disease risk factors, of which obesity is included (NICE, 2014). The aim of exercise referral schemes is to improve health through physical activity (NICE, 2014). Typically, a programme of physical activity is provided for 10 to 12 weeks and may be subsidised or free of charge, however this varies nationwide; they involve an initial assessment and programme development followed by monitoring and supervision throughout (Williams et al., 2007). A systematic review by Pavey *et al* (2012) examined uptake and adherence to ERS reporting a wide range for both uptake (28-100%) and adherence (12-93%). When looking at adherence to completing the referral period across study types the pooled mean was 43% (observational studies) vs 49% (Randomised controlled trials [RCT]) (Pavey et al., 2012).

Following NICE guidance that ERS were not as effective as they could be recent research has been performed to characterise and evaluate ERS more thoroughly (NICE, 2014). In a survey of 30 ERS in England with a combined total of 85,259 exercise referral scheme participants, schemes were typically 12 weeks in length, offering participants 2 exercise sessions in a fitness gym or studio per week, using a combination of exercises, with adherence typically being measured through attendance (Rowley et al., 2021). There were often variations in programme delivery, non-exercise components and programme management methods. In a study of four ERS services in Scotland the exercise referral practitioners prescribed exercise to improve activities of daily living, promote independence and autonomy of participants, rather than explicitly targeting the referral condition (Shore et al., 2021a). This is not surprising since the aims of ERS are to enhance physical activity behaviours of participants from low active to at

least moderately active, which is associated with the largest improvement in health and wellbeing if maintained according to public health guidelines. However, whilst over-medicalising the exercise approach may not be as conducive to behaviour change as we would think, having an understanding of the reasons for the referral can help to inform targeted exercise prescriptions that might bring about improved biofeedback to support PA behaviour change and perhaps enhance public health on a larger scale.

Systematic review evidence suggests that longer length schemes that provide >20 weeks improve adherence to the prescribed physical activity, resulting in improved health outcomes compared to 8-12 week schemes for people with cardiovascular, mental health, and musculoskeletal disorders (Rowley et al., 2018). The review also found that schemes tend not to tailor services to suit the participants' health conditions, which does not fit with consumers' needs or support self-determined physical activity choices, potentially reducing adherence and improvement in quality of life. A review of review of studies reporting the uptake, attendance, prescribed exercises and adherence of ERS found that the reporting of these key performance indicators was insufficient (Shore et al., 2019). This information is important to indicate the populations who may benefit from engaging in an ERS but who do not, to indicate the populations that engage in particularly types of ERS activities and those who do not and to indicate which ERS components are associated with enhanced adherence. Such data might be used locally within a scheme but also as part of the national ERS database. A study of uptake, attendance and session count in an ERS in Scotland reported that in this scheme there were no sociodemographic differences between attenders and non-attenders, yet there was a 68% exit rate at 5 sessions or less (Shore et al., 2021b). This is significant since health benefits can only be attained by adhering to the exercise prescription. This is not to say that the participants had not begun to self-manage their PA away

from the leisure-based ERS. In an analysis of a national ERS database the majority of people referred were already in the moderately active category, yet managed to increase their PA further by engaging in more vigorous intensity PA as part of the ERS (Rowley et al., 2020). This suggests that people already in an action phase of PA behaviour change are making use of services and are reporting increased PA behaviour any way, but still within the moderately active category. The indication in this study suggests an increased focus on supporting PA contemplators and preparers for PA to engage in ERS should be encouraged.

The role of the Exercise Referral Practitioner

We refer to an ERS within the context of the structured exercise component of services that typically requires fitness professionals or exercise physiologists to be trained to work with clinical populations i.e. as a Chartered Institute for the Management of Sport and Physical Activity (CIMSPA) registered Exercise Referral Practitioner, or equivalent elsewhere in the world. The professional must be trained to develop and manage an ERS, perform consultations, apply and interpret initial and follow-up assessments, prescribe personalised exercise, apply personalised behaviour change techniques & goal-setting and deliver exercise training activities for the particular population they are working with. In the context of this book the long-term conditions considered are low to moderate risk where exercise is recommended to manage or even ameliorate the client's referred condition(s) to prevent future significant disease or disability. Generally, people considered eligible for entry to an ERS are classified as physically inactive, i.e. not meeting physical activity guidelines, and presenting one or more of the long term conditions in Table 1.1.

>insert Table 1.1. here<

For this reason, the pathophysiology of these conditions, fitness assessment methods, exercise prescription adaptations and exercise leadership guidance are provided within this book to help to guide current and future professionals in working with people with long term conditions in the exercise referral setting.

Graduate Exercise Referral Practitioners

It is possible for graduates to progress in the broad field of exercise referral with sufficient education and experience to be British Association of Sport and Exercise Sciences (BASES) Certified Exercise Practitioner or with higher level training to become an accredited Clinical Exercise Physiologist through on of American College of Sports Medicine (ACSM), Biokinetics Association of South Africa (BASA), Clinical Exercise Physiology UK (CEP-UK), Canadian Society of Exercise Physiology (CSEP) or Exercise and Sports Science Australia (ESSA), depending on where you reside and wish to practice. Further details of career progression as a Clinical Exercise Physiologist are available in the resources section at the end of this chapter and an example of developing a career as an Exercise Referral Practitioner or Clinical Exercise Physiologist is illustrated in Box 1.1.

>insert Box 1.1 here<

Using this book

The book should be read in its entirety to provide information about ERS and being an ER Practitioner. The chapters have been compiled in such a way that they can be read as standalone chapters. This chapter and chapters Two and Three provide the experiences of the chapter authors in developing an ERS (Chapter Two) and leading a National ERS (Chapter Three). Chapter Four details best practice methods for working with a referred person and applying relevant person-centred health-fitness assessments. Chapters Five to Nine detail the often-neglected approach of engaging people to change their health-physical activity behaviour, particularly in the ERS setting. These include personalising the experience for the person through to supporting the maintenance of newly-found physical activity behaviours following completion of a scheme. Finally, Chapters Ten to 20 cover condition-specific considerations to support you in your understanding of these conditions in the exercise setting. Each chapter relating to heath conditions (Chapters 10-20) contains the following sub-sections:

- Introduction to the condition
- Medication and medical management
- Effect of condition/treatment on the exercise response
- Effects of exercise training
- Exercise prescription principles
- Chapter summary and key points
- Study tasks

Pedagogic aids are provided to support your learning. Figures, tables and boxes are used to illustrate and consolidate information provided in the text. Case studies are provided in each chapter to illustrate the application of the principles communicated in the chapter to an exercise

referral example and study tasks are presented to encourage you to think independently about each chapter. The references that are used provide additional relevant information, which you are also encouraged to read. Lastly, in each of the condition-specific chapters we present a table illustrating the effect of common medications on the exercise response and a one-page at-a-glance guide to encapsulate each chapter for ease of reference in your practice.

We hope you enjoy reading the book and applying the information in your practice.

Resources

The following are professional training routes that professionals can undertake to work towards becoming an excise specialist for people with health conditions:

- CIMSPA Exercise Referral Practitioner https://cimspa.co.uk/membership/sport-and-physical-activity-practitioner/exercise-referral-practitioner-–-membership-entry-requirements
- BASES Certified Exercise Practitioner https://www.bases.org.uk/sspage-professional_development-accreditation_and_endorsement-certified_exercise_practitioner__cep_.html
- Registered Clinical Exercise Physiologist with CEP-UK https://www.clinicalexercisephysiology.org.uk/
- Accredited Exercise Physiologist with ESSA https://www.essa.org.au/Public/Consumer_Information/What_is_an_Accredited_Exercise_Physiologist_.aspx
- Certified Clinical Exercise Physiologist
  - With ACSM https://www.acsm.org/get-stay-certified/get-certified/cep
  - With CSEP https://csep.ca/csep-certification/csep-professional-standards-program-cep/
- Biokineticist with BASA https://biokineticssa.org.za/biokineticist-info/#qualifications

References

Ainsworth, B., Haskell, W.L., Herrmann, S.D., Meckes, N., Bassett, D.R. Jr., Tudor-Locke, C., Greer, J.L., Vezina, J., Whitt-Glover, M.C., Leon, A.S. (2011). 2011 Compendium of Physical Activities: a second update of codes and MET values. Medicine and Science in Sports and Exercise, 43(8), 1575-1581.

Caspersen, C.J. Powell, K.E. & Christenson, G.M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. Public Health Reports, 100(2), 126-31.

Department of Health and Social Care (2019). Physical Activity Guidelines: UK Chief Medical Officers Report. London Author.

Kokkinos, P. (2012). Physical activity, health benefits, and mortality risk. ISRN Cardiology, 718789.

Lee, I-M. , Shiroma, E.J., Lobelo, F., Puska, P., Blair, S.N., Katzmarzyk, P.T. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. The Lancet, 380(9838), 219-229.

McKinney, J., Lithwick, D.J., Morrison, B.N., Nazzari, H., Isserow, S., Heilbron, B., Krahn, A.D. (2016). The health benefits of physical activity and cardiorespiratory fitness. BC Medical Journal, 58(3), 131-137.

National Institute for Health and Care Excellence (2014). Physical Activity: Exercise Referral Schemes. London: Author. Available at: https://www.nice.org.uk/guidance/ph54

NHS Digital (2020). Statistics on Obesity, Physical Activity and Diet, England – 2020. Available at: https://www.gov.uk/government/statistics/statistics-on-obesity-physical-activity-and-diet-england-2020-ns

Pavey, T.G., Taylor, A., Hillsdon, M., Fox, K., Campbell, J., Foster, C., Moxham, T., Mutrie, N., Searle, J., Taylor, R. (2012). Levels and predictors of exercise referral scheme uptake and adherence: A systematic review. Journal of Epidemiology and Community Health, 66, 737-744.

Rowley N, Mann S, Steele J, Horton E, Jimenez A. (2018). The effects of exercise referral schemes in the United Kingdom in those with cardiovascular, mental health, and musculoskeletal disorders: a preliminary systematic review. BMC Public Health. 18(1), 949. doi: 10.1186/s12889-018-5868-9.

Rowley N, Steele J, Wade M, Copeland RJ, Mann S, Liguori G, Horton E, Jimenez A. (2020). Are Exercise Referral Schemes Associated With an Increase in Physical Activity? Observational Findings Using Individual Patient Data Meta-Analysis From the National Referral Database. J Phys Act Health. 17(6), 621-631. doi: 10.1123/jpah.2019-0435.

Rowley N, Steele J, Mann S, Jimenez A, Horton E. (2021). Delivery Approaches Within Exercise Referral Schemes: A Survey of Current Practice in England. J Phys Act Health. 18(4), 357-373. doi: 10.1123/jpah.2020-0388.

Shore CB, Hubbard G, Gorely T, Polson R, Hunter A, Galloway SD. (2019). Insufficient Reporting of Factors Associated With Exercise Referral Scheme Uptake, Attendance, and Adherence: A Systematic Review of Reviews. J Phys Act Health. 16(8), 667-676. doi: 10.1123/jpah.2018-0341.

Shore CB, Hubbard G, Gorely T, Hunter AM, Galloway SD. (2021a). The match between what is prescribed and reasons for prescribing in exercise referral schemes: a mixed method study. BMC Public Health. 21(1), 1003. doi: 10.1186/s12889-021-11094-z.

Shore CB, Hubbard G, Gorely T, Hunter AM, Galloway SDR. (2021b). Associated Sociodemographic and Facility Patterning of Uptake, Attendance, and Session Count Within a Scottish Exercise Referral Scheme. J Phys Act Health. 18(5), 557-562. doi: 10.1123/jpah.2020-0539.

Warburton, D., Nicol, C.W., Bredin, S.S. (2006). Health benefits of physical activity: The evidence. Canadian Medical Association Journal, 174(6), 801-809.

Williams, N., Hendry, M., France, B., Lewis, R., Wilkinson, C. (2007). Effectiveness of exercise-referral schemes to promote physical activity in adults: systematic review. British Journal of General Practice, 57(545), 978-986.

Winter, E., Fowler, N. (2009). Exercise defined and quantified according to the Systeme International d'Unites. Journal of Sports Sciences, 27, 447-460.