Archives of Psychiatric Nursing 28 (2014) 135–151

Contents lists available at ScienceDirect

Archives of Psychiatric Nursing

journal homepage: www.elsevier.com/locate/apnu

Selection, Use and Psychometric Properties of Physical Activity Measures to Assess Individuals with Severe Mental Illness: A Narrative Synthesis

Andrew Soundy [a,*], Carolyn Roskell [a], Brendon Stubbs [b], Davy Vancampfort [c]

[a] School of Health and Population Sciences, College of Medicine and Dentistry, 52 Pritchatts Road, University of Birmingham, Edgbaston, Birmingham, UK
[b] School of Health and Social Care, University of Greenwich, Southwood Site, Avery Hill Road, Eltham, London, UK
[c] University Psychiatric Center, Catholic University Leuven, Campus Kortenberg, Leuvensesteenweg 517, Kortenberg, Belgium

A B S T R A C T

This research provides a critical consideration of the outcome measures used to assess physical activity in individuals with severe mental illness. A narrative synthesis was utilised to provide a simple juxtapose of the current research. A sensitive topic-based search strategy was conducted in order to identify studies that met the eligibility criteria. Fifty two studies met the inclusion criteria and 5 were identified specially as validation studies. The current research identified several methodological shortcomings. The justification and choice of outcome measure used is often weak and only five studies have validated a specific outcome measure of physical activity. Within these validation studies, the validation process often lacked a consideration of agreement between measures. Accelerometers have been most frequently used as a criterion measure, notably the RT3 tri-axial accelerometer. Objective based measures may be best placed to consider physical activity levels, although, methodological considerations for the utilization of such tools is required. Self-report questionnaires have benefits for use in this population but require further validation. Researchers and clinicians need to carefully consider what outcome measure they are using and be aware of the development, scope and purpose of that measure.

Severe mental illness (SMI) is a term that relates to all mental disorders, with the largest diagnosis within the description as schizophrenia. The term severe refers to the fact that the mental illness interferes with daily functioning and that illness symptoms are reoccurring. In addition to this, the condition is characterized by the need to consider safety (for others, abuse from others, & self harm) and the need for informal (e.g., friends) and formal (e.g., support services) care (Cohen, Singh, & Hague, 2004; Department of Health, 1995; Department of Health and Human Services, 1999). Physical activity and exercise are important modifiable lifestyle choices for individuals with SMI and play a role in preventing and treating cardio-metabolic risk factors (Vancampfort et al., 2010a). Increasing physical activity can benefit the individual's physical and mental health (Gorczynski & Faulkner, 2011). Monitoring physical activity levels is important for surveillance and for assessing the effectiveness of physical activity interventions. Investigation of the dose–response relationship between physical activity and physical and mental health outcomes is dependent on a reliable and valid responsive assessment of physical activity.

The current understanding of the patterns and levels of physical activity is based on a range of different outcome measures. The different tools capture variable information and it cannot be assumed that this information is accurate or provides a complete picture of physical activity patterns. Outcome measures that capture physical activity are largely represented by two groups, including self-report questionnaire (SRQs) and objective based measures (OBMs). SRQs (self or interviewer administered) are used as a primary way of measuring physical activity in studies in individuals with SMI. Such measures provide a cheap and easy way to collect physical activity data from a large number of people in a short time. In the last few years there has been a surge of research studies (Sharpe, Stedman, Byrne, & Hills, 2006a; Soundy, Taylor, Faulkner, & Rowlands, 2007; Yamamoto et al., 2011) that have considered the use of OBMs (measures including; calorimetric measures, physiological markers, motion sensors and monitors and direct observation). One of the reasons for this increase in OBMs is to provide a clearer and objective picture of physical activity patterns. This is partly as a response to the limitations apparent when considering SRQs. For example, recall bias by participants (Soundy et al., 2007), the use of a summative scale which is not comparative with other measures, or not illustrative of the four primary domains (Warren et al., 2010) of physical activity (frequency, intensity, time or type) undertaken. In addition, there is variability in the time scale considered as well as the questions contained within the instrument (a factor partially influenced by the original design of the scale and

* Corresponding Author: Dr Andrew Soundy, Lecturer Physiotherapy, School of Health and Population Sciences, College of Medicine and Dentistry, 52 Pritchatts Road, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK.
E-mail addresses: A.A.Soundy@bham.ac.uk (A. Soundy), C.A.Roskell@bham.ac.uk (C. Roskell), davy.vancampfort@uc-kortenberg.be (D. Vancampfort).

0883-9417/1801-0005$34.00/0 – see front matter. Crown Copyright © 2014 Published by Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.apnu.2013.12.002

population it was validated on). Finally, not all SRQs have been validated against an OBM or a gold standard measure and the SRQs that have been fully validated may have not considered agreement between measures. This is an essential aspect that should be included in validation studies (Bland & Altman, 1999, 2010; Plasqui & Westerterp, 2007; Warren et al., 2010).

Whilst the selection of a method to assess physical activity is always a trade-off between degree of validity and feasibility, the chosen method, nevertheless, must be suitable for the research aims. The choice of an inaccurate method will lead to crude and misleading outcome data (Warren et al., 2010). This provides the impetus for research which asks the questions 'can we trust what the literature tells us about the patterns of physical activity in individuals with SMI?' and, 'what are the potential limitations of this literature?' Traditional reviews may be limited in addressing these questions and other approaches may be indicated. Notably, a review is needed that is able to consider; (1) the measurement properties of outcome measures, (2) the accuracy of the methodological procedures and processes undertaken by previous studies the include individuals with SMI (3) a process that can generate recommendations for future research. Thus, the requirements for this review are well suited to a more novel approach to data extraction and synthesis in order to examine a specific aspect of the methodology of previous literature and provide an in depth consideration of the previous tools used.

AIMS OF THE STUDY

The primary aim is to provide a critical consideration of the application of research tools used to assess physical activity in individuals with SMI. Secondary aims include (a) establishing the quality of studies that have attempted to validate SRQs in this population and (b) generating recommendations for good practice for the use measurement tools in this population.

METHODS

A narrative synthesis review was conducted according to the general guidance (Pope, Mays, & Popay, 2007). This type of review offers a transparent and systematic means of bringing together evidence from studies which are heterogeneous in a number of ways. Various techniques and tools are applied to, firstly, integrate findings from selected studies and, secondly, interpret the meaning of the results enabling new understanding of the topic under scrutiny to emerge (Rodgers et al., 2009). The process is conducted in 4 stages: 'Developing a theory'; 'Developing a preliminary synthesis'; Exploring relationships', and 'Assessing the robustness of the synthesis' (Pope et al., 2007).

Developing a Theory

This paper sought to conduct a review based on the theoretical assumption that physical activity levels can be measured in people with SMI using measures that are reliable and valid but that methodological weakness in some published literature, arising from inadequate consideration of the measurement properties of tools used, may undermine conclusions relating to physical activity levels in people with SMI. The use of narrative synthesis seeks to explore this assumption generating recommendations for future use of physical activity measurement tools in this population.

Developing a Preliminary Synthesis

A systematic search of the literature was conducted focussed to the theoretical assumptions outlined above. The focus of the search was to locate literature that has measured the patterns of physical activity within a cross sectional or interventional study.

Information Sources and Search Strategy

Electronic searching was conducted, from database inception to August 2012, using Cochrane Library, CINAHL, EBSCO, EMBASE, Medline, PEDro, PubMed, PsychINFO, SPORTSdiscus, Science Citation Index and Social Science Citation Index; ZETOC databases; selected Internet sites (e.g. CSP) and Indexes (Turning Research into Practice, Health Services/Technology Assessment, PUBMED); hand searches of key journals; unpublished research: British National Bibliography for Report Literature, Dissertation Abstracts, Index to Scientific and Technical Proceedings, National Technical Information Service, System for Information on Grey Literature.

Separate searches were conducted for each identified SRQ and alternate terminology for generic SRQs, to allow statistics to be reported against individual OMs. Each search strategy combined key terms for the population and the SRQ of interest (Mokkink et al., 2012), key terms and terminology used in the search strategy replicated that used in a previous systematic review (Prince et al., 2008). Hand searches were made on the reference lists of articles including recent review articles related to physical activity and SMI (Prince et al., 2008; Scott & Happell, 2011; Vancampfort et al., 2010b, 2011b) and of articles included in the current study.

Eligibility Criteria (Inclusion and Exclusion Criteria) for the Review

An article was included in the review when: a) the study population and the study sample included people identified as having a formal diagnosis of SMI (Cohen et al., 2004; Department of Health, 1995; Department of Health and Human Services, 1999); b) the article reported assessment of physical activity using a SRQ or OBM, including validation studies, cross sectional studies or baseline findings of intervention studies; c) the article was published in English; d) articles used a tool that could express the three fundamental dimensions of physical activity (frequency, duration and intensity) (Warren et al., 2010) were included, ideally, the inclusion of the type of physical activity was also included (Armstrong & Welsman, 2006). This was selected to provide a greater comparison between the different SRQ and OBM tools used. Exclusion criteria were defined as: a) studies available only in an abstract, conference proceeding or thesis, or, summarized in a book; b) studies whose primary focus was not on physical activity, as this may limit the justification of the tool selected; c) reviews, including systematic reviews, narrative reviews, critical appraisals; d) articles reporting other aspects of physical activity such as factors contributing to the level of physical activity and/or qualitative research; e) research orientated to the fitness level of individuals with SMI. There was no restriction on publication date.

Study Selection Process

The full text of an article was retrieved when, following discussion between two reviewers (AS/CR), it was agreed that it could not be unequivocally excluded based on its Title and Abstract (Center for Reviews, Dissemination (CRD) (CRD), 2009). An article was included when the reviewers agreed that it satisfied all eligibility criteria. The number of articles identified at each stage was recorded for each outcome (see Fig. 1). Because of the number of studies identified the included and excluded studies are identified within a table (see Table 1).

Tools and Techniques Used to Inform Preliminary Synthesis

Three specific techniques were used to bring findings together for comparison and subsequent interpretation: