



Autonomy support, light physical activity and psychological well-being in Rheumatoid Arthritis: A cross-sectional study

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ABSTRACT

Background: Participation in physical activity may improve psychological well-being among people with Rheumatoid Arthritis (RA). This study examined the implications of autonomy support for physical activity, on objectively assessed light physical activity (LPA) engagement, and in turn, psychological well-being in RA. In addition, the role of lower-limb functional disability in these associations was investigated.

Methods: RA patients (n = 50) completed questionnaires assessing 1) autonomy support for physical activity [from a patient-specified important other], 2) functional disability to 'rise' and 'walk' (functional disabilityRW), 3) depressive symptoms, and 4) subjective vitality. Levels of LPA [100–2019 counts/minute], were calculated from 7 days of accelerometry.

Results: Path analysis supported a model ($\chi^2(2) = 2.44, p = 0.30, CFI = 0.99, SRMR = 0.05, RMSEA = 0.07$) in which important other autonomy support for physical activity significantly and positively predicted LPA engagement. In turn, LPA was significantly and positively associated with subjective vitality, and significantly and negatively linked to depressive symptoms. These associations were observed independently of adverse direct relationships between functional disabilityRW with depressive symptoms and subjective vitality.

Conclusions: Important other autonomy support for physical activity may hold positive consequences for LPA engagement and related psychological well-being in RA, independent of the negative effects of lower-limb functional disability.

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1. Introduction

Research underlines the benefits of regular participation in physical activity for promoting more optimal psychological health among both healthy adults and patient cohorts (Bauman, Merom, Bull, Buchner, & Fiatarone Singh, 2016; Cairns & McVeigh, 2009; Penedo & Dahn, 2005; Windle, Hughes, Linck, Russell, & Woods, 2010). People living with Rheumatoid Arthritis (RA) frequently report compromised psychological well-being (Gettings, 2010; Murphy, Sacks, Brady, Hootman, & Chapman, 2012). Thus,

participation in physical activity may prove beneficial for enhancing psychological health in this patient group.

To date, the focus of RA studies has been on the psychological health benefits resulting from participation in physical activity above moderate intensity (i.e., ≥ 3 metabolic equivalents, METS) (Kelley, Kelley, & Hootman, 2015; Verhoeven et al., 2016; Windle et al., 2010). However, the reduced functional ability associated with RA, may restrict individuals' perceived ability to engage and subsequently, overtly participate in moderate intensity physical activity (Hernandez-Hernandez, Ferraz-Amaro, & Diaz-Gonzalez, 2014; Sokka et al., 2008; Veldhuijzen van Zanten et al., 2015). Conversely, participation in lower-intensity physical activities (i.e., light physical activity, 1.6–2.9 METS) may be perceived as relatively more feasible and achievable by people living with RA (Manns, Dunstan, Owen, & Healy, 2012), and is being increasingly

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advocated to improve overall health in several other clinical and ageing populations (Buman et al., 2010; Ekwall, Lindberg, & Magnusson, 2009; Larsen et al., 2014; Manns et al., 2012; Trinity, 2017). However, studies to date are yet to investigate the psychological health implications of engagement in light physical activity (LPA) for people living with RA, as well as factors that may influence engagement in this behaviour (i.e., determinants).

The social environment operating within physical activity settings has been proposed as a key determinant of physical activity behaviour. For example, Self-determination theory (SDT) (Deci & Ryan, 1987), suggests where the social environment supports an individual's sense of autonomy with regards to their physical activity engagement (i.e., it promotes choice and understanding), this is more likely to encourage the adoption and maintenance of physical activity behaviour (Chan, Lonsdale, Ho, Yung, & Chan, 2009; Fortier, Duda, Guerin, & Teixeira, 2012; Milne, Wallman, Guilfoyle, Gordon, & Corneya, 2008). The social environment is largely created by the interpersonal behaviours of 'significant' or 'important' others acting within that setting (Deci & Ryan, 1987; Deci & Ryan, 2002). When considering physical activity in RA, this 'important other' could be the health care professional (e.g., rheumatology consultant, nurse, or GP) or other individuals the patient considers relevant to their attempts to be physically active (e.g., a spouse, offspring or friend) (Edmunds, Ntoumanis & Duda, 2007; Hardcastle, Blake, & Hagger, 2012; Williams, 2002).

Recent research revealed autonomy support for physical activity provided by 'important others', was linked to higher levels of self-reported total physical activity (comprising light, moderate and vigorous) among people living with RA (Yu et al., 2015). However, this study did not examine the role of autonomy support for LPA participation specifically, and a reliance on self-reported estimates of PA somewhat limits the validity of these findings. Thus, research is required to investigate the implications of autonomy support for objectively assessed LPA engagement in RA, to determine whether the social environment represents a salient and modifiable determinant of LPA in these patients. In turn, investigating the extent to which variability in LPA (predicted by autonomy support) is associated with psychological well-being in RA, will help to establish the potential value of interventions focused on creating autonomy supportive physical activity environments for improving psychological well-being among this patient group.

Upon investigating these associations, we must still consider the possibility that the compromised physical function symptomatic of RA may represent a barrier to even low-intensity physical activity engagement for these patients. Of particular relevance is functional disability related to standing and walking – two common light intensity activities. Indeed, walking is reported as the most common behaviour undertaken by people living with RA, and light intensity walking (including standing, and incidental and sporadic movement) comprises approximately 90% of ambulatory behaviour (Paul et al., 2014). Accordingly, an individual's disability related to 'standing' and 'walking' (i.e., lower-limb functional disability) should be taken into account when seeking to identify modifiable determinants of LPA participation in RA (e.g., the social environment).

The primary aim of this research was therefore to examine the implications of autonomy support for physical activity and lower-limb functional disability, for levels of objectively assessed LPA engagement, and associated positive and negative indicators of well-being in RA. Specifically, this study sought to examine the sequential associations between perceived autonomy support from a participant specified 'important other', lower-limb functional disability to 'rise' and to 'walk', accelerometer assessed LPA, and in turn, depressive symptoms and subjective vitality among people living with RA (Fig. 1). These two outcomes are particularly

pertinent to psychological functioning in RA. Specifically, depression represents a highly prevalent co-morbidity in RA (Ang, Choi, Kroenke, & Wolfe, 2005; Margaretten, Julian, Katz, & Yelin, 2011; Treharne et al., 2005), and subjective vitality provides an indication of an individual's overall optimal psychological functioning (Rouse et al., 2015; Ryan & Deci, 2001).

It was hypothesised that higher lower-limb functional disability (poorer function), would be negatively associated with LPA engagement. It was also expected that perceived 'important other' autonomy support would be *independently* and positively associated with LPA, and that LPA would be subsequently positively related to subjective vitality, and negatively associated with depressive symptoms (Fig. 1). That is, we propose that autonomy support for physical activity predicts variability in LPA, to the degree it will hold positive implications for psychological well-being among people living with RA, after taking into account lower-limb functional disability.

2. Methods

2.1. Participants

Patients with RA were recruited as part of the Physical Activity in Rheumatoid Arthritis (PARA) study (Trial Number: -ISRCTN04121489). The PARA study was a randomised controlled trial, with the aim of promoting self-determined motivation for exercise engagement and improving cardiorespiratory fitness (Rouse et al., 2014). Baseline data were used to answer the current research questions. The study was granted ethical approval by the local National Health Service Research Ethics Committee (reference: 10/H1206/59).

2.2. Recruitment and protocol

Information sheets were distributed to interested participants attending Rheumatology outpatient clinics at Russells Hall Hospital (Dudley Group of Hospitals NHS Foundation Trust). In total, 115 participants (Mage = 53.98 ± 12.47 years) were recruited to the PARA study and provided informed consent. Questionnaire data were collected from participants during appointments at Russells Hall Hospital. Following this, accelerometer data were collected over 7 days among a sub-subsample of willing participants (n = 97). The full PARA study protocol is detailed elsewhere (Rouse et al., 2014).

3. Measures

3.1. Important other autonomy support for physical activity

Important other support for physical activity (here-on referred to as autonomy support) was assessed using an adapted version of the Important Other Climate Questionnaire (IOCQ) (Williams et al., 2006). Participants were first asked to indicate who they consider to be the 'most important person in their effort to engage in physical activity' (e.g., a spouse, sibling, offspring, friend). Following this, participants responded to 6 statements regarding the degree of perceived autonomy for physical activity provided by their important other, as follows; 1) I feel that my important other has provided me with choices and options in regards to my physical activity, 2) I feel my important other understands how I see things with respect to my physical activity participation, 3) my important other conveys confidence in my ability to make changes regarding my physical activity participation, 4) my important other listens to how I would like to do things regarding physical activity, 5) my important other encourages me to ask questions about physical

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