The Better Ageing Project: Physical activity, quality of life and psychological well-being

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Introduction
The Better Ageing Project is a multicentre European collaboration to investigate the effect of exercise on the physical function and well-being of the frail elderly. Little is known about the impact of physical activity on aspects of functional fitness such as strength, daily activity patterns, quality of life and psychological well-being. First, we attempted to document patterns and levels of daily physical activity using both objective and self-report measures. Second, we provided a comprehensive profile of mental well-being using a range of standardised questionnaires. Third, through qualitative methods we summarised participant and leader reactions to the standard physical activity programme that was the basis of the project exercise intervention. Our research aim was to improve our understanding of older people’s activity patterns, levels of psychological well-being and the impact of exercise on these variables.

Method
The pool of participants were 115 females and 89 males (mean age 75.8±3.9y) recruited from Better Ageing project sites in the UK, France and Italy. Physical activity was measured using uniaxial accelerometers (Actigraph Model 7164, Manufacturing Technology Inc., FL, USA) and the PASE self-report instrument. Control (CON) and intervention (INT) participants were briefed to wear the actigraph for the waking hours of at least a full week (168 hours) at baseline and at 12 months on completion of the intervention. Data were reduced to derive estimates of daily physical activity energy expenditure (PAEE) (kcal.d⁻¹), and minutes per day (min.d⁻¹) of sedentary activity(<200 counts per minute(CPM)), light activity (200-1999 CPM), and moderate or vigorous activity (MVPA) (>1999 counts per minute). Instruments used to assess psychological well-being were the WHOQOL-BREV, the Satisfaction with Life Scale, the General Well-Being Schedule, the Ageing Well Profile and the Physical Self-Perception Profile. Back translation was conducted where needed. Questionnaires were administered at baseline, 6 months and 12 months. Additionally, 30 one-to-one interviews were conducted with participants who completed the INT (n=20), participants who dropped-out (n=2), INT group participants (n=2) exercise deliverers (n=4) and exercise researchers (n=2) from the two UK sites. Interviews were transcribed and coded for content.

Results
Ninety-one females and 73 males completed baseline PA measures. Participants expended a mean of 303.7±142.5 kcal.d⁻¹, spending 625.0±116.1 min.d⁻¹ in sedentary activity, 225.9±81.1 min.d⁻¹ in light activity and 19.8±16.3 min.d⁻¹ in MVPA. Only 23.2% of participants achieved the Chief Medical Officer’s recommendations of 30 min.d⁻¹ of MVPA. Males had significantly higher PAEE (366.2±158.6 vs. 256.0±107.5 kcal.d⁻¹, p<0.001) and were more active (23.6±20.0 vs. 16.9±12.3 min. MVPA.d⁻¹, p<0.05) than females. Participants under 75 years had significantly (p<0.001) higher PAEE than those over 80 (348.9±147.2 vs. 225.2±142.5 kcal.d⁻¹). From baseline to follow up for both CON (n=34) and INT (n=75) groups there were significant (p<0.001) reductions in both PAEE (CON -27.9±88.4, INT -37.7±127.0 kcal.d⁻¹) and MVPA (CON -5.2±10.6, INT -5.2±14.9 min. MVPA.d⁻¹). However, there was no significant (p>0.05) difference between CON and INT groups. The factor most predictive (R²=0.561, p<0.001) of decline in MVPA and PAEE was higher PA level at baseline. Psychometric analyses indicated reliability of instruments was good but the dimensional elements of some instruments was not robust so totals for some scales were used in analyses. Logical relationships among different constructs were seen in correlational analyses. Sedentary time was weakly and negatively related to several well-being indicators (perceived physical health; r=-.26), light activity showed some weak positive relationships, but they were stronger for amount of moderate activity (physical health well-being; r=.22) and energy expenditure per day (physical health well-being: r=.23). MANOVA indicated significant increases in physical self-perceptions in the males in the INT group when compared to CONs. Interviews with participants identified a strong commitment to the programme based on the belief of contributing to science and society. Participants described improved ability for performing everyday activities, cognitive function, mood, self-perceptions and a strong sense of achievement and success. Positive programme factors included appropriate exercise intensity, gradual progress, the knowledge, patience and enthusiasm of the exercise professionals and positive social environment. Participants clearly expressed their preference for the group vs. the home-based exercise programme and reported their initial discomfort with some scientific tests. Leaders sensed that participants' physical competence improved across a range of gym and home-based markers of functionality.

Conclusion
This comprehensive data set provides important initial insight into the physical activity patterns of the frail elderly. Considerable variance exists, few achieve UK recommendations and there is a tendency for a decline over time. It indicates that physical activity is associated with improved quality of life and well-being even in these healthy older people. Although, the questionnaire analysis indicated positive changes in physical self-perceptions for men attending the exercise programme, interview data suggested a much stronger impact.