IS PHYSICAL ACTIVITY A GOOD WAY TO IMPROVE QUALITY OF LIFE IN THE ELDER POPULATION?

Teresa Bento
Anabela Vitorino
Luís Cid

ABSTRACT

Background: Although evidence demonstrates that physical activity beneficially influences major chronic illnesses, older adults remain sedentary. Many interventions to increase physical activity intend to reduce disease complications as well as improve quality of life by enhancing physical function in our even more aging society.
Objectives: The purpose of this study was to summarize knowledge on randomized controlled trials studying the effects of physical activity interventions on quality of life in the elder population.
Methods: Randomized controlled trials, systematic reviews or meta-analysis were searched in the Pubmed data base. Search terms: "quality of life", "intervention" and "physical activity" were used to identify English written articles, with humans older than 65 years.
Results: From the initial screening of 234 titles, only 5 articles met the inclusion criteria and were included in the final analysis.
Conclusions: Physical activity interventions seem to have a slight effect on physical function and in improving quality of life of people aged 65 and over. More intervention studies involving physical activity in older people should include measures of quality of life as primary outcome, as well as a standardization of measures would help to compare results and enlarge the evidence base in this area.

Keywords: Review, Elder, Quality of life

JEL Classification: I31

1. BACKGROUND

The stated evidence of the benefits of physical activity (PA) with advancing age (Ehrman, deJong, & Sanderson, 2010), has induced the development of innumerous research on the effects of PA on health.

Many interventions to increase physical activity intend to reduce disease complications as well as improve quality of life (QOL) by enhancing physical function in our even more aging society.

Quality of Life (QOL) is defined as each one´s subjective evaluation of it´s well-being in the physical, psychological and social domains (WHOQOLGroup, 1994), is a multi-dimensional concept and includes both positive and negative aspects of life (José, 2013). Related to this very broad definition are the Health-Related Quality of Life (HRQL) and the Health-Status (HS) concepts, which are not the same as QOL. HRQF is a narrower concept than QOL since it refers to the physical, psychological and social domains as influenced/

impacted by disease (Moons, 2004), contributing to the subjective evaluation of the well-being. On the other hand, HS although including the same domains as HRQL, is a simple evaluation of the function. Several instruments can measure QOL, but the Sf-36 Health Survey and the WHOQOL - The World Health Organization Quality of Life Assessment, appear to be more frequently used in studies analyzing the relationships between QOL, physical activity and health.

As a consequence of the development of many primary studies on the effects of PA on health and in QOL, there has also been summaries of the existing body of evidence on the beneficial effects of exercise on QOL in later life expressed in narrative reviews (Rejeski, Brawley, & Shumaker, 1996) and meta-analysis (Kelley & Kelley, 2009).

However, as stated by Conn *et al.* (Conn, Hafdahl, & Brown, 2009), many of these literature reviews have focused on the "side effects" that increasing PA has on QOL, focusing on symptoms or health outcomes presumed to be related to QOL, ignoring the fact that PA may improve QOL beyond physical function changes.

2. OBJECTIVES

Few available reviews and meta-analysis evaluated QOL as primary outcome variable or used QOL instruments to measure it directly (Fox, 1999; Puetz, Beasman, & O'Connor, 2006). Regarding the older population many studies have summarized the evidence, however, most studies addressed the frail older adults (Chin, van Uffelen, Riphagen, & van Mechelen, 2008; Chou, Hwang, & Wu, 2012) or older adults samples with specific diseases (Devos-Comby, Cronan, & Roesch, 2006).

Considering the need to provide accurate information to practitioners, the purpose of this study is to summarize research outcomes from randomized controlled trials studying effects of physical activity interventions on quality of life in the older population.

3. METHODS

Search Strategy

Pubmed database, was searched for randomized controlled trials, systematic reviews or meta-analysis between September and October, 2013.

The keywords: "quality of life", "intervention", "physical activity" and "exercise", combined using the bolean operators "AND" and "OR", were used to identify English written articles published in the last five years.

Previous meta-analysis or systematic reviews summarizing the effects of physical activity intervention programs in the variables of quality of life or in physical activity were included and analyzed to identify eventual articles to be included in the present study. References lists were searched to identify any other potential articles missed in the database search and authors were contacted to request missing data.

3.1 Study Selection

The inclusion criteria of studies were: randomized controlled trials (RCTs) developed in humans older than 65 years, with no specific known disease; intervention programs including physical activity with the main goal enhancing the quality of life and consequently increasing participation in physical activity.

Studies were selected if reported outcome measures including quality of life or health-related quality of life as primary or secondary variable, evaluated directly.

Studies were excluded if they were developed with participants suffering or undergoing treatment for any specific or known disease such as: cancer, osteoarthritis, dementia, Parkinson´s disease, COPD, cardiovascular disease, obesity or diabetes, among others. Only the studies performed with patients of depression symptoms or anxiety were included because of its relationship to the main variables in study, however, if the outcomes of the QOL variable was not evaluated directly, studies were excluded. Research evaluating the cost effects of interventions, health economic components (QALYS), disability adjusted life years (DALYS) that reported no relevant data, were also excluded.

3.2 Data Extraction and Quality Assessment

Author, year, aim of the study, sample characteristics, outcome measures, methods, and main conclusions were abstracted from the studies into a summary table by two reviewers.

The methodological quality of the selected studies was assessed by two reviewers using the modified version of an established checklist for systematic reviews on quality of life (Van Son, De Vries, Roukema, & Den Oudsten, 2013) and using the Physiotherapy Evidence Database Scale - PEDro Scale, 0-10 score (de Morton, 2009; Maher, Sherrington, Herbert, Moseley, & Elkins, 2003). Discrepancies between reviewers were resolved by consensus.

Flow chart of the study is presented in Figure 1.

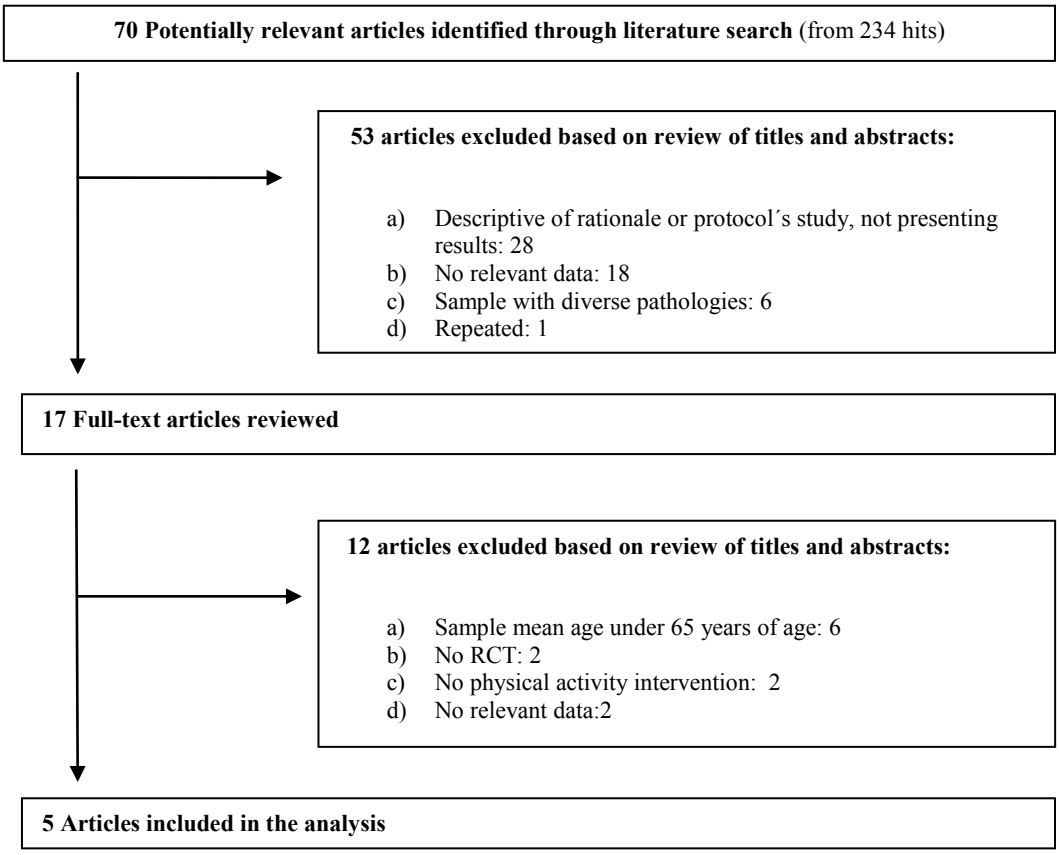

Figure 1 - Study Flow Diagram

4. RESULTS

In the five studies included, sample sizes ranged from 53 to 392, and a total of 958 participants were involved in the trials. Three of the five studies, included only women (Karinkanta et al., 2012; McMurdo et al., 2011; Vestergaard, Kronborg, & Puggaard, 2008),

and one was oriented to inactive or sedentary elders (McMurdo et al., 2011). Others were specifically designed to institutionalized (Vind, Andersen, Pedersen, Joergensen, & Schwarz, 2010) or frail older people (Vestergaard et al., 2008).

The participants were recruited in the community, at home (Karinkanta et al., 2012; McMurdo et al., 2011; Vestergaard et al., 2008), or in institutions (Dechamps et al., 2010; Vind et al., 2010).

The intervention programs, which included a PA component, were characterized by very heterogeneous methods used by researchers. Some, included PA as part of a behavior change intervention (McMurdo et al., 2011), or of a prevention falls program (Karinkanta et al., 2012; Vind et al., 2010), while others implemented a specific training program (Dechamps et al., 2010; Vestergaard et al., 2008). PA was prescribed in sessions ranging from three to four times a week (Dechamps et al., 2010; Karinkanta et al., 2012; Vestergaard et al., 2008), lasting from 26 (Vestergaard et al., 2008) or 30 minutes (Dechamps et al., 2010), to 45 minutes (Karinkanta et al., 2012). Durations of interventions varied from five (Vestergaard et al., 2008) or six months (McMurdo et al., 2011) to 12 months (Dechamps et al., 2010; Karinkanta et al., 2012; Vind et al., 2010).

Only one study reported a weekly goal prescription with no minimum duration or frequency details (McMurdo et al., 2011). One study was not supervised (Vestergaard et al., 2008) and other included a follow-up evaluation after 24 months from baseline (Karinkanta et al., 2012). Some studies included more than one evaluation throughout the study (Dechamps et al., 2010; Karinkanta et al., 2012; McMurdo et al., 2011).

Follow-ups and multiple evaluations may be relevant to address maintenance of behaviors, because effects may take longer to be observed in specific populations such as the older ones. One of the studies with multiple evaluations, observed an increase in PA behavior in the initial three months of trial (McMurdo et al., 2011) which reverted to baseline measures after more three months of a behavior change intervention with inactive older people.

The majority of the RCTs included in this analysis were developed to analyze primarily the QOL effects of a PA intervention program (Dechamps et al., 2010; Karinkanta et al., 2012; Vestergaard et al., 2008; Vind et al., 2010), and only one study evaluated QOL as a secondary outcome (McMurdo et al., 2011).

Only one research measured PA outcomes by means of accelerometry and pedometry (McMurdo et al., 2011) and other applied the Rating of Perceived Exertion - Borg Scale (Vestergaard et al., 2008) for controlling the intensity of the sessions. Other authors did not provide information about the methods for controlling of the intensity of the sessions or informed about other details on the prescription of the PA.

The HRQOL concept was preferred to QOL and was evaluated by different kinds of tools: Euro-Quol (McMurdo et al., 2011), the RAND-36 (Karinkanta et al., 2012), SF- 36 (Vind et al., 2010), and the EQ-5D combined with self-rated health (Vestergaard et al., 2008). One study used the Neuropsychiatric Inventory (NPI) (Dechamps et al., 2010).

All studies aimed at studying the effects of PA in HRQOL. Some studies observed no significant changes in the HRQOL outcomes (McMurdo et al., 2011; Vind et al., 2010), findings that have already been stated in previous reviews with older adults with chronic illnesses by (Conn et al., 2009) and in frail older adults (Chou et al., 2012), and by Kelley meta-analysis (Kelley & Kelley, 2009). On the other hand, others concluded that PA interventions may contribute to slow down the HRQOL decline in elderly persons (Dechamps et al., 2010) and one other verified a maintenance in the HRQOL outcome measures (Vestergaard et al., 2008) at the end of the intervention.

5. DISCUSSION

This review was conducted with the purpose of summarizing the existing RCTs published on the effects PA intervention program in HRQOL in older people (sample mean age above 65 years). However, summarizing the results from the selected studies may be inconclusive considering the diversity of tools used by the researchers to assess outcome measures, the different of ways of reporting results, the differences in PA prescription, and even in the premises upon each one was based.

As subjective as the concept may be, we observed that very few studies included a definition of HRQOL or QOL, or made a distinction between HS and QOL, which may be another factor for discrepancy in results as well as in methodological options observed.

Around six studies aiming at analyzing the effects of PA intervention in QOL were excluded due to mean age of samples be under 60 years of age, which confirms that most intervention studies with older adults have been developed with "lesser" older population, and therefore more primary studies aiming the older population should be encouraged.

Some studies included in this review concluded that PA interventions may contribute to slow down the HRQOL decline in elderly persons (Dechamps et al., 2010), and others observed a maintenance of HRQOL measures (Vestergaard et al., 2008). However, the more positive results came from interventions using specific physical activity (thai-chi and walking), which may limit the extrapolation of the results for other physical activities.

Although the aims of the selected studies were to analyze the effect of PA (or of interventions including PA) on HRQOL, the majority of studies lack a clear cause-effect conclusion. Therefore, a dose-response effect may not be delivered or reported by the investigators or summarized hereby.

The only study using instruments such as the pedometers to measure and control PA variables, showed that these devices ended up to be beneficial only for the maintenance of a low dropout rate, because no improvements were observed in the measured outcomes (McMurdo et al., 2011). For this reason, this study stands out from the rest since is one of the few RCT published using an objective measurement of the PA instead of using self-reported measures. Nonetheless, no improvements were observed in the HRQOL by the use of pedometers, and authors advise that the limitations of their study may be related to the fact that only sedentary women were recruited to participate in the study.

Authors, who reported limited effects of their intervention (Karinkanta et al., 2012), address limitations to the deficient responsiveness of the scale used to evaluate the HRQOL outcome (RAND-36). Since there is no gold standard measure for evaluating QOL, researchers continue to use the one that best suits their aims, which may be too diverse.

6. MAIN CONTRIBUTION OF THIS STUDY

Findings from this review may be limited by the potential bias from the various definitions of QOL and HRQOL, and it was not possible to recommend which type of exercise is most beneficial.

Analysis of the existing literature makes us suggest that future primary studies should address QOL as primary outcome and use specific measures. Also, researchers should define standard ways of reporting results in order to enable comparisons of results and provide summaries of evidence to guide the practice. More studies focusing on the whole dimensions of QOL are needed, and not only those of the physical function.

Finally, answering our research question, we may say that the review performed provided evidence on the positive, but rather weak role of PA interventions in HRQOL in older adults.

REFERENCES

Chin, A. Paw M. J., van Uffelen, J. G., Riphagen, I., & van Mechelen, W. (2008). The functional effects of physical exercise training in frail older people : a systematic review. *Sports Med, 38*(9), 781-793.

Chou, C. H., Hwang, C. L., & Wu, Y. T. (2012). Effect of exercise on physical function, daily living activities, and quality of life in the frail older adults: a meta-analysis. *Arch Phys Med Rehabil, 93*(2), 237-244.

Conn, V. S., Hafdahl, A. R., & Brown, L. M. (2009). Meta-analysis of quality-of-life outcomes from physical activity interventions. *Nurs Res, 58*(3), 175 - 183.

de Morton, N. A. (2009). The PEDro scale is a valid measure of the methodological quality of clinical trials: a demographic study. *Aust J Physiother, 55*(2), 129-133.

Dechamps, A., Diolez, P., Thiaudiere, E., Tulon, A., Onifade, C., Vuong, T. (2010). Effects of exercise programs to prevent decline in health-related quality of life in highly deconditioned institutionalized elderly persons: a randomized controlled trial. *Arch Intern Med, 170*(2), 162 - 169.

Devos-Comby, L., Cronan, T., & Roesch, S. C. (2006). Do exercise and self-management interventions benefit patients with osteoarthritis of the knee? A metaanalytic review. *J Rheumatol, 33*(4), 744-756.

Ehrman, J. K., deJong, A., & Sanderson, B. (2010). *ACSM´s resource manual for guidelines for exercise testing and presciption* Philadelphia: Lippincott Williams & Wilkins.

Fox, K. R. (1999). The influence of physical activity on mental well-being. *Public Health Nutr, 2*(3A), 411-418.

José, J. S.; Barros R.; Samitca, S.; Teixeira, A. (2013). Social care and well-being. Experiences and Perspectives of an old-aged group. *Journal of Spatial and Organizational Dynamics,* Volume I, Issue 3, 187-201.

Karinkanta, S., Nupponen, R., Heinonen, A., Pasanen, M., Sievanen, H., Uusi-Rasi, K. (2012). Effects of exercise on health-related quality of life and fear of falling in home-dwelling older women. *J Aging Phys Act, 20*(2), 198-214.

Kelley, G. A., & Kelley, K. S. (2009). Impact of progressive resistance training on lipids and lipoproteins in adults: a meta-analysis of randomized controlled trials. Prev Med, 48(1), 9-19.

Maher, C. G., Sherrington, C., Herbert, R. D., Moseley, A. M., & Elkins, M. (2003). Reliability of the PEDro scale for rating quality of randomized controlled trials. Physical Therapy, 83(8), 713-721.

McMurdo, M. E., Sugden, J., Argo, I., Boyle, P., Johnston, D. W., Sniehotta, F. F. (2011). Do pedometers increase physical activity in sedentary older women? A randomized controlled trial. *J Am Geriatr Soc, 58*(11), 2099-2106.

Moons, P. (2004). Why call it health-related quality of life when you mean perceived health status? *Eur J Cardiovasc Nurs, 3*(4), 275-277

Puetz, T. W., Beasman, K. M., & O'Connor, P. J. (2006). The effect of cardiac rehabilitation exercise programs on feelings of energy and fatigue: a meta-analysis of research from 1945 to 2005. *Eur J Cardiovasc Prev Rehabil, 13*(6), 886-893

Rejeski, W. J., Brawley, L. R., & Shumaker, S. A. (1996). Physical activity and health-related quality of life. *Exerc Sport Sci Rev, 24*, 71-108.

Van Son, M. A., De Vries, J., Roukema, J. A., & Den Oudsten, B. L. (2013). Health status, health-related quality of life, and quality of life following ankle fractures: a systematic review. *Injury, 44*(11), 1391-1402.

Vestergaard, S., Kronborg, C., & Puggaard, L. (2008). Home-based video exercise intervention for community-dwelling frail older women: a randomized controlled trial. *Aging Clin Exp Res, 20*(5), 479-486.

Vind, A. B., Andersen, H. E., Pedersen, K. D., Joergensen, T., & Schwarz, P. (2010). Effect of a program of multifactorial fall prevention on health-related quality of life, functional ability, fear of falling and psychological well-being. A randomized controlled trial. *Aging Clin Exp Res, 22*(3), 249-254

WHOQOLGroup. (1994). Development of the WHOQOL: rationale and current status. *Int J Mental Health, 23*, 24-56.