



# Improving Physical Activity and Health of Older People Involved in a Social Farming Regional Preventative Multidimensional Programme in Italy

## RESEARCH

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## ABSTRACT

Physical exercise and social activities play a role of primary importance in the prevention of diseases and in maintaining functional abilities in old age, nevertheless, maintaining a regular habit of exercise is considered a challenge during the aging process. Motivation to start and maintain physical activity is an essential factor. Among older adults, when promoting exercise, it is preferable to focus on means of activities intrinsically pleasurable, rather than on health improvements. From this perspective, our study is aimed to understand if preventative interventions combining physical activity, self-efficacy, and social participation in the context of a natural environment might be of help in increasing the level of physical activity. The sample was composed of 95 subjects, of which 40 were excluded because declared to be already engaged in regular physical activity at baseline. Considering the final sample of 55 subjects with low or no physical activity at baseline, 21 subjects (38.2%) improved the intensity of their physical activity at follow-up. They were younger (52.4% with age  $\geq 70$  vs 82.4;  $p = 0.017$ ), mostly women (85.7% vs 58.8%;  $p = 0.036$ ), and had a higher balance test score with respect to the others ( $3.6 \pm 0.7$  vs  $2.8 \pm 1.0$ ;  $p = 0.005$ ). Results should be able to strengthen the concept that having a good level of physical abilities, such as good balance, facilitates the path for greater physical improvements and better quality of life among older adults. Balance issues may be cause of fear of falling and psychological difficulties which may have limited the effects of the programme.

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## KEYWORDS:

preventative multidimensional programme; physical activity; older people; active ageing

## TO CITE THIS ARTICLE:

Contiero, D., Bonfigli, A. R., Piccinini, F., Fabbietti, P., Gambella, E., Giuliotti, M. V., & Gagliardi, C. (2023). Improving Physical Activity and Health of Older People Involved in a Social Farming Regional Preventative Multidimensional Programme in Italy. *Physical Activity and Health*, 7(1), pp. 205–216. DOI: <https://doi.org/10.5334/paah.262>

## AGING POPULATION AND HEALTH RELATED ISSUES

The world population continues to age precipitously. It is estimated, in fact, that in 2019, the number of subjects aged 65 or over was 703 million, with the forecast of increasing to 1.5 billion in 2050 (Guo et al., 2022). The aging process is associated with a decline in functional abilities, a greater frailty, and longevity does not always correspond to a good quality of life (Merchant et al., 2021). The World Health Organization (WHO) considers the process of healthy aging to be the process during which the functional skills and abilities for one's well-being are developed or maintained (Beard et al., 2016). According to the scientific literature, physical exercise and social activities play a role of primary importance in the prevention of diseases and in maintaining functional abilities in later life (Merchant et al., 2021). Keeping physically active is not only good for the body, but also for the mind. In fact, physical activity is considered a very valuable tool in the prevention and reversal of depressive diseases, even among seniors (Zhang et al., 2021).

The World Health Organization suggests that people over the age of 65 to do at least 150–300 minutes of moderate-intensity aerobic physical activity or at least 75–150 minutes of vigorous-intensity physical activity; nevertheless, the WHO clarifies that replacing sedentary time with physical activity of any intensity (including light intensity) is always better than doing none (WHO 2020). The multicenter, randomized, controlled LIFE study (Pahor et al., 2014) demonstrated that a program of moderate-intensity physical activity (compared to a health education program) significantly reduced motor disability in older adults with mild physical limitations.

Nevertheless, maintaining a regular habit of exercise is considered a challenge during the aging process (Rivera-Torres et al., 2019): the UK ELSA study reported, for instance, people aged 70–79 years being about 50% less likely than those aged 50 to 59 years to be engaged in exercise and physical activity, adding emphasis on the importance of promotion aimed at obtaining constant practice intervening on mediating variables (Stevens et al., 2003).

Previous literature highlighted the way individual's level of physical activity is affected by a number of correlated personal characteristics such as age, sex, social support and one's health status and self-efficacy, the last two being the most recurrent in older adults (Bauman et al., 2012).

This is an important factor to consider is the motivation to start and maintain physical activity and exercise (Ryan and Deci, 2000; Teixeira et al., 2006). Devereux et al. 2016 have highlighted that in older people motivation can be affected by the poor prospect of achieving major physical improvements. Their research pointed out that rather than promoting physical activity programs based on health improvements, many people will be more interested in activities that will be intrinsically pleasurable, such as interactions with other people who are also performing the activities (Devereux-Fitzgerald et al., 2016).

In this perspective, preventative multidimensional interventions combining social participation with physical activity (e.g. leisure time activities that include a physical activity component) might be of help in promoting healthy ageing in the elderly population (Tcymbal et al., 2022).

## FACTORS CORRELATED TO PHYSICAL ACTIVITY IN OLDER PEOPLE

Scientific literature confirms that high levels of physical activity are linked to high levels of self-esteem and self-efficacy (McAuley et al., 2005). One of the main deterrents of preventive activities, such as physical activity, is the "ageism" (Menkin et al., 2022) negative or positive stereotypes, prejudice and/or discrimination against (or for the benefit) of the elderly on the basis of based on their chronological age or on the basis of their perception as "old" or "elderly" (Iversen et al., 2009).

Often, older people themselves tend to endorse the belief that functional decline is unavoidable in later life and this can lead them to be less open to preventative health behaviours (Nelson, 2016). Fighting ageism is necessary and the most effective weapons are activities that improve self-esteem and body image (Bergman, 2022). For this purpose, it is considered useful to encourage the perception of oneself in the elderly as able to face new or challenging experiences in different areas of life. This type of attitude towards problems and stressful

events, or simply towards new goals, implies the achievement or recovery of a sense of self-efficacy, a psychological dimension strongly linked to that of self-esteem. A high level of self-efficacy, in fact, is considered a facilitating element in the pursuit and achievement of one's goals and is connected to persistence in the face of obstacles and the ability to recover quickly in the face of a stressful event (Bandura, 1977).

Functional limitations affect adherence to exercise (Aartolahti et al., 2015). One of the most used and trusted tool evaluating functional impairment is the "Short Physical Performance Battery (SPPB)" test (Bruyère et al., 2017; Pel-Littel et al., 2009; Perracini et al., 2020; Van Kan et al., 2008) created by Dr. Guralnik that includes a series of exercises for assessing balance, strength and endurance (Guralnik et al., 1994). The three dimensions are often used in a number of studies. For instance, poorer walking speed (Timed Up and Go) at 9-year follow-up was linked to a reduction of mobility in a sample of older women (Idland et al., 2013). Karinkanta et al. (2005) showed that dynamic balance is an independent predictor of a standardized quality of life in home-dwelling elderly women. This is because balance issues in elderly people are really affecting quality of life, causing isolation, injuries, functional limitations, psychological difficulties, decreased everyday activities and increase admission to nursing homes (Kovács et al., 2013).

Support currently received by family and friends is considered a strong predictor of exercise adherence (Oka et al., 1995). In particular, positive support from others can increase self-efficacy to perform physical activity, through imitation and social learning (e.g., being an exercise partner) and verbal persuasion (e.g., reminding, encouraging, and reinforcing) (Bandura, 1977). More generally, a solid social network helps to take better care of one's health, at all levels: elderly people who suffer from social isolation are more at risk of lacking of motivation to change (Seeman, 1996).

Subjective health perception is another factor associated to physical activity. Describing a state of how one feels and evaluates his or her state of health is correlated with objective health outcomes, such as functional status (Dostálová et al., 2021; Idland et al., 2013).

## **SOCIAL FARMING AND THE PROJECT SOCIAL AGRICULTURE FOR ACTIVE LONGEVITY OF THE MARCHE REGION**

In this framework the project named "**Social Agriculture for active longevity**" started in 2019 from the will of the Marche Region (Italy) to experiment innovative initiatives and services aimed at the elderly population in order to enhance social participation and well-being in peri-urban and disadvantaged areas of the territory lacking services to support the elderly population.

Three family-run farms, distributed throughout the Marche region, took part in this programme. The strategies used were focused on promoting physical activity, self-efficacy, social participation in the context of a natural environment. The programme scheduled a minimum of 50 days distributed in horticultural and occupational activities, socializing and a programme of physical exercise.

## **RESEARCH HYPOTHESIS**

Based on the collected scientific literature, the authors believe that a program of social farming, where older adults are involved in social events, group learning and physical activities, would be ideal to engage their interests in developing new skills, to socialise, to adhere to exercise programs and finally to improve the quality of life.

## **METHODS**

### **PARTICIPANTS' RECRUITMENT AND STUDY DESIGN**

The participants were recruited through a public recruitment campaign promoted by the Marche Region Agriculture Bureau and the farms. Recruitment was conducted by means of voluntary associations and personal contacts, day care centres, facilities for older people and municipalities. The participants lived in urban and rural environment and freely decided to participate after being informed of the study objectives, the programme activities, and the outcome monitoring. The presence of one or more disease was not considered a reason for

exclusion, which is supported by the literature (Young et al., 2009). For this study, the authors selected a single group pre-test post-test design. Ethical approval was not mandatory for this study according to the Italian law. Data protection and privacy were granted through a consent letter that was signed by the participants to allow the processing of personal data. Potential participants that showed impossibility or unwillingness to sign the written consent; or with neoplastic disease or life expectancy <1 year, presence of cognitive disorders and other impediments that do not guarantee correctness adherence the programme were excluded. Selection and recruitment of participating subjects contemplated the signature of informed consent, the verification of the inclusion/exclusion criteria, the enrolment.

## STUDY OBJECTIVES AND EVALUATION PROTOCOL

The objective of the study was to evaluate if the participant of the programme increased their level of physical activity at follow up.

The respondents were asked to answer to the question “Do you exercised regularly past year?” (no/yes with long interruptions/yes with short interruptions /yes without interruptions). Then the modalities “yes with short interruptions” and yes “without interruptions” were summed up into a single variable named Physical activity past year.

The authors are aware that answering questions does not provide an objective measurement of physical activity; on the other hand, physical fitness perception is positively correlated to physical activity levels and it has been previously used as marker of health-related fitness (Flanagan and Perry, 2018; Shephard and Bouchard, 1995).

Demographic characteristics aside (Sex, Age, living alone, Education), the research team established 5 main variables to consider as correlates of physical potential improvements based on the literature, Self-efficacy, Social network and support, Physical performance/Frailty, Quality of life, Perceived health.

### Self-efficacy

The construct of self-efficacy refers to self-perception of oneself as being able to face new or difficult experiences in various areas of life. The perception of self-efficacy facilitates the pursuit and achievement of one’s goals, persistence in the face of obstacles and the ability to recover quickly in the face of a stressful event. It can therefore be considered as a resilience factor and It was measured by means of the GSES-General Self-Efficacy Scale (Bandura, 1977; Schwarzer, 1993).

### Social network and support

Lubben Social Network Scale-6 (LSNS-6) is a weighted sum of these six items. Scores range from 0 to 30. This tool is designed to assess social isolation in older adults by measuring perceived social support received from family and friends including trusting relationships. (Lubben, 1988).

### Physical performance/Frailty

The Short Physical Performance Battery (SPPB) test is used to assess lower limb physical function and disability (Guralnik et al., 1994). The SPPB test consists of three sections: the assessment of balance, the assessment of walking speed on 4 linear meters and the assessment of the ability to perform the sit to stand from a chair for 5 consecutive times without using the upper limbs. Each of the three SPPB sub-tests are rated with a score from 0 to 4, where a higher score denotes better performance; the SPPB test provides a total score (sum of the scores of the 3 sections) ranging from 0 to 12. Although there are no conclusions on the cut off score for the diagnosis of frailty, it is estimated that the best cut-off point for the determination of frailty was  $\leq 8$ , while the best cut-off point for the determination of the frailty process was  $\leq 10$ . Points (Perracini et al., 2020). Physical performance assessment included the three sub-score and the total score of SPPB.

### Quality of life

The EuroQol questionnaire (EQ-5D) is a validated tool for measuring perceived quality of life. Due to its ease and speed of administration it is one of the most used tools to assess the quality of life and is frequently administered to elderly patients (Feng et al., 2021). The EQ-5D

consists of two distinct sections. In the first, a 3-point scale subjective evaluation of difficulty is requested for five dimensions (EQ-1 mobility, EQ-2 self-care, EQ-3 daily activities, EQ-4 pain/discomfort and EQ-5 anxiety/depression).

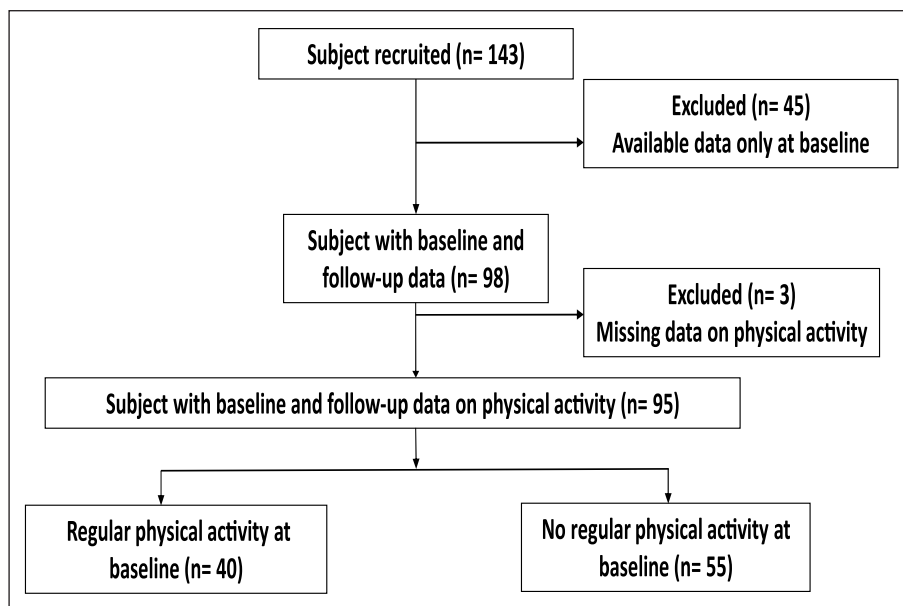
### Perceived health

The second section of EQ5D includes a visual analogue assessment (VAS) graphically represented by a graduated scale ranging from 0 (worst possible health status) to 100 (best possible health status) on which the respondent indicates perceived level of health.

### STATISTICAL ANALYSIS

The authors provided descriptive analysis of the study population grouped according to physical activity intensity at baseline. In the sub-sample of physically inactive population, significant variations in the potential correlates at follow-up were analysed. Continuous data were expressed by mean  $\pm$  standard deviation, while categorical ones were reported as number (percentage). Chi-square test was used to analyse categorical variables, while t-test for independent samples was used for continuous ones. In order to study the correlates of physical activity improvement at follow-up, logistic regression model adjusted for confounders was built and fully adjusted model with age and balance test score was created. Statistical analysis was carried out using SPSS for Win V24.0 (SPSS Inc., Chicago, IL, USA). A p-value  $< 0.05$  was considered statistically significant.

### RESULTS



**Figure 1** Sampling procedure flowchart.

The flowchart (Figure 1) describes sampling procedures. From an initial total sample of participants to the programme, 48 subjects were excluded because the entire data (n = 45) or physical activity answers (n = 3) were missing at follow-up.

Therefore, the eligible sample was composed of 95 subjects. The mean age of the participants was 73.94 (standard deviation of 7.078) and they were mostly female (69.5%). 68.3% of participants attended high school. 23% of people included in the study lived alone (data not shown). As our research question was to evaluate if the participants increased their level of physical activity at follow up, those subjects who declared they had engaged in regular physical activity with short or non-stop breaks since the starting of the programme, were excluded from further analyses (n = 40), thus leaving a final sample of 55 subjects who were physically inactive at baseline (Table 1). In Table 1 we compared the main variables between the two groups at baseline. Significant differences were found in EQ1(mobility), EQ2(self-care), EQ3(usual activity), EQ4(pain/discomfort), Perceived health, GSES Lubben (items 1–6 social network), Lubben (item 7 perceived support). Then we tested variables variations of the physically inactive sample (n = 55) at follow-up. The analysis highlighted that the physically inactive population

gained in the quality of life sub-dimensions, namely in EQ2(self-care), EQ4(pain/discomfort), EQ5(depression/anxiety), level of perceived health and SPPB score (Table 2). Further analysis was aimed at finding an improvement in the level of physical activity at follow-up. Those who improved the intensity of their physical activity at the end of the programme (38.2%; n = 21) were mostly women, significantly younger (Figure 2) and presented a higher balance test score than those who remained inactive (Figure 3). There were no other significant differences between the two groups.

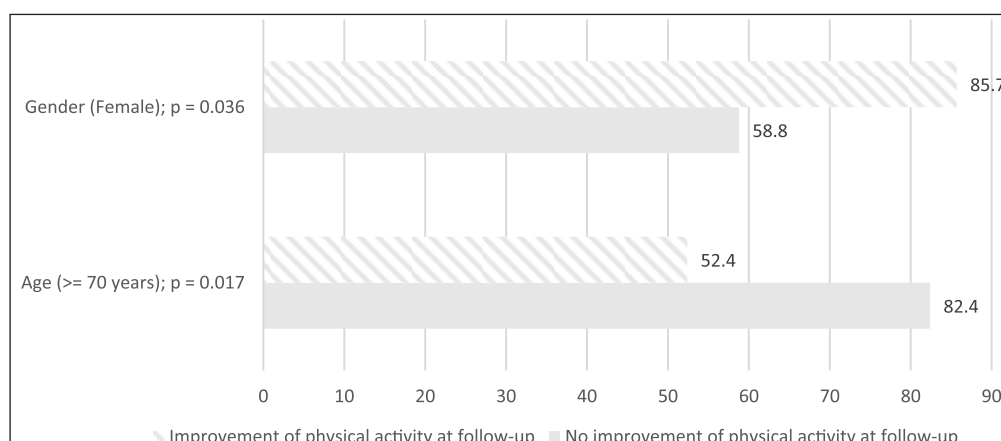
Finally, these significant variables were included in a multi variate logistic model as potential correlates of improvement in physical activity at follow-up (Table 3). Trough backward stepwise method, gender was dropped out, leaving a final model with age and balance score test. So, after adjusting for age, balance score test was significantly associated with improvement in physical activity at follow-up (OR: 2.41; 95%CI: 1.03–5.62).

		NO/YES WITH LONG BREAKS (N = 55)	YES WITH SHORT BREAKS/YES WITHOUT BREAKS (N = 40)	P
Gender, female	n (%)	39 (69.6)	27 (69.2)	0.966
Age, >=70	n (%)	39 (69.6)	23 (59.0)	0.283
Living alone, Yes	n (%)	10 (18.5)	11 (32.4)	0.138
Education, >= High school	n (%)	38 (70.4)	25 (69.4)	0.925
EQ1(mobility)	Mean ± sd	1.7 ± 0.9	1.5 ± 0.8	0.202
EQ2(self-care)	Mean ± sd	1.3 ± 0.8	1.0 ± 0.2	0.029
EQ3(usual activity)	Mean ± sd	1.5 ± 1.1	1.2 ± 0.4	0.093
EQ4(pain/discomfort)	Mean ± sd	2.4 ± 0.8	1.8 ± 0.7	0.001
EQ5(depression/anxiety)	Mean ± sd	1.9 ± 0.8	1.6 ± 0.8	0.207
Perceived health	Mean ± sd	69.5 ± 15.3	78.6 ± 15.6	0.006
GSES	Mean ± sd	29.5 ± 4.4	31.1 ± 4.0	0.068
Lubben (items 1-6 social network)	Mean ± sd	14.8 ± 5.5	18.3 ± 5.2	0.003
Lubben (item 7 perceived support)	Mean ± sd	3.0 ± 1.6	3.6 ± 1.4	0.049
SPPB	Mean ± sd	8.9 ± 2.1	9.3 ± 1.6	0.292
Balance score	Mean ± sd	3.1 ± 1.0	3.1 ± 1.2	0.804

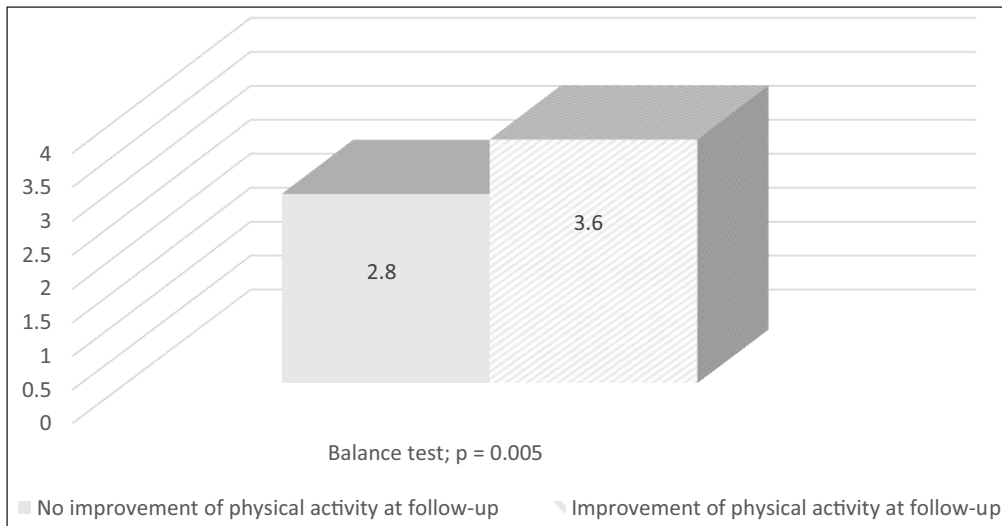
**Table 1** Differences between physical activity at baseline (n = 95).

		BASELINE	FOLLOW-UP	P
EQ2(self-care)	Mean ± sd	1.3 ± 0.8	1.2 ± 0.7	0.019
EQ4(pain/discomfort)	Mean ± sd	2.4 ± 0.8	2.1 ± 0.7	0.027
EQ5(depression/anxiety)	Mean ± sd	1.8 ± 0.8	1.4 ± 0.6	0.002
Perceived health	Mean ± sd	69.6 ± 15.4	75.3 ± 15.8	0.018
SPPB	Mean ± sd	8.9 ± 2.1	9.6 ± 2.5	0.044

**Table 2** Main significant variations at follow-up in the physically inactive sample (n = 55).



**Figure 2** Improvement of physical activity by gender and age (%).



**Figure 3** Improvement of physical activity by balance test (means).

FULLY ADJUSTED MODEL OR (95%CI)	
Age	0.36 (0.09 – 1.48)
Balance Test	2.41 (1.03 – 5.62)

**Table 3** Correlates of improvement of physical activity at follow-up.

## DISCUSSION

The main outcome of the study was to detect the variation of the level of physical activity of a group of older people who participated in a preventative multidimensional programme for improving active aging. For the analysis, a sub-sample of those who declared to be inactive at baseline was selected. The first analysis underlined that the sample positively gained after the experience from the perspective of quality of life (i.e. less pain, less mental discomfort), self-perception of health and functional score on the way to avoid the risk of disability. These findings support social farming as an innovative community-based service provider of social goods that can improve the quality of life of older people. In the perspective of active aging, both mental health and physical health are a very important withdrawal from the risk of frailty. We found out that even participants that did not take part in the physical exercise intervention reported a better score in sub dimensions of quality of life. This might be related to the fact that their engagement in a physically active environment, together with the other multidimensional interventions such as socialization might have affected their general wellbeing. Leisure time activities that include a physical activity component might be of help in promoting healthy ageing in the elderly population. It is important to remember physical activity, considered as any bodily movement produced by skeletal muscles that requires energy expenditure such as gardening, walking, dancing, household chores, and physical exercise is effective in improving the general well-being. On the other hand, leisure activity does not necessarily relate to an improvement of fitness test as SPPB. In fact there is a difference between physical activity and physical exercise, that is planned, structured and repetitive and performed with the aim of improving fitness and health (Caspersen et al., 1985). Therefore, our results are in line with the literature that suggests a correlation between general physical activity, in which mostly all participants were involved, and wellbeing. Then the authors examined which variables were associated to the variation in the level of physical activity at the end of the programme. The research team analysed the data to understand significant differences between the ones that changed their lifestyle and the ones that did not.

Results outlined that the more active ones are the younger ones, among the 55 participants. They are mostly females, and had a better balance score at the recruitment. Data showed the improvement in physical activity at follow-up increasing on average by 140% as the balance test score increases, also considering the effect of the subject's age. These data can be very significant for future studies to evaluate an age range where lifestyle change is easier to gain. Results should be able to strengthen the concept that having a good level of physical conditions, as good balance, facilitates the path for greater physical improvements and better quality of life among older adults. This is also something we can find in previous studies. Park et al. show that balance exercises are an important component in interventions to improve quality of life in

later age (Park, 2011). Similarly, Karinkanta et al. show that dynamic balance is an independent predictor of a standardized quality of life in home-dwelling elderly women (Karinkanta et al., 2005). This is because balance issues in elderly people are really affecting quality of life, causing isolation, injuries, functional limitations, psychological difficulties, decreased everyday activities and increase admission to nursing homes (Kovács et al., 2013). Scientific research has already proved without any doubts that the best way to improve balance is through physical activity, especially Adapted Physical Activity (Kovács et al., 2013; Papalia et al., 2020). Physical inactivity, or sedentary behaviour, on the other hand are proved to be determinant for progressive physical impairments, leading consequently to isolation and low quality of life (Meyer et al., 2020; Papalia et al., 2020). Someone might argue that not all 55 participants improved their balance and active lifestyle during the intervention. If that is true, one should also consider that exercise adherence among older adults is very challenging and it is one of the major health promotion barriers in this age group (Jefferis et al., 2014; Rivera-Torres et al., 2019). Only 15.3% of those aged 65 and over are estimated to meet physical activity guidelines (Elgaddal et al., 2022).

Furthermore, some interesting results come from the comparison between participants with a sedentary lifestyle and those with an active lifestyle at baseline. The main differences between the two groups consist in two of the five quality of life dimensions, self-care and pain/discomfort, in their perception of health, in self-efficacy and social inclusions, where the active group is presenting higher scores. These results are consistent with the literature showing that those physically active are more likely to present higher level of self-efficacy, (Tikac et al., 2022). Consistently, some literature suggests that healthcare professionals should consider the implementation of exercise programmes to improve mood and self-efficacy in elderly people (Miller et al., 2019). Similar results have been previously reported for quality of life. Acree et al. showed that older adults who regularly participated in physical activity had higher HRQL score than sedentary subjects (Acree et al., 2006). Being physically active in later life has proved to be also effective to get a better view of one's health perception (Condello et al., 2016) and to develop social inclusion (Sunarti et al., 2021). On the other hand, always in the literature, we find that people with a sedentary lifestyle, as the majority of participants, show higher risk of anxiety, depression and lower quality of life (de Oliveira et al., 2019; Eriksson et al., 2020). This definitely affects their social life, as elderly people with a sedentary behaviour are more likely to be less socially involved (Reed et al., 2011). Being isolated is not only a social issue but it is an important health disadvantage too. In fact isolated elderly people show more often symptoms of mental and physical disturbs as depression (Choi et al., 2015), sarcopenia, falls and fear of falling that limits their ability to go out, to socialize, pushing them in a vicious circle of sedentary habits and loneliness (Landi et al., 2012; Merchant et al., 2020).

In conclusion, the social farming programme was useful in promoting a change in terms of participants' lifestyle, physical activity and quality of life. The programme was also well approached by elderly people that confirmed a good adherence to the programme, suggesting that such activities should be taken in considerations when planning interventions to improve lifestyle and quality of life in later age. On the other hand, the authors are aware that results are on a small scale, that improvements are significative but not outstanding and that future similar researches should include more specific adapted physical activity intervention, rather than general physical activities. Future studies should focus on more specific age targets and participants' physical abilities at recruitment, in order to aim for stronger outcomes and more significant lifestyle changes.

## LIMITATION

The major limitations of the current study are the relatively simple assessment of physical activity and the small sample related to double selection made in order to identify those participants physically inactive at baseline and that showed improvements. Besides, the recall of the past activity may be influenced by the present status.

Another possible limitation is that the authors decided not to identify specific characteristics for participants' recruitment, if not the ones discussed in the methods. On the other hand, it is important to consider the environment of rural areas where the study was performed, and the average participant age. Because of these factors, it could have been unrealistic to



impose advanced participants' selection criteria because there was the risk to bias the faithful representation of the local community and the aim of the social farm per se, that is that one to include local elderly from every background and any physical or mental ability.

## FUNDING INFORMATION

This study was partially supported by Ricerca Corrente funding from Italian Ministry of Health to IRCCS INRCA.

## COMPETING INTERESTS

The authors have no competing interests to declare.

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*Physical Activity and Health*  
DOI: 10.5334/paah.262

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#### TO CITE THIS ARTICLE:

Contiero, D., Bonfigli, A. R., Piccinini, F., Fabbietti, P., Gambella, E., Giuliotti, M. V., & Gagliardi, C. (2023). Improving Physical Activity and Health of Older People Involved in a Social Farming Regional Preventative Multidimensional Programme in Italy. *Physical Activity and Health*, 7(1), pp. 205–216. DOI: <https://doi.org/10.5334/paah.262>

**Submitted:** 16 February 2023

**Accepted:** 21 April 2023

**Published:** 19 June 2023

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