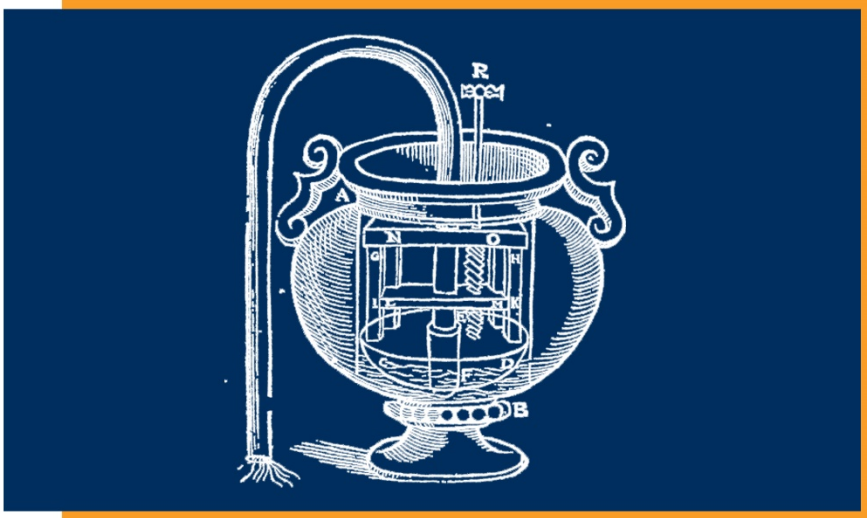
CNR-IRCrES Working Paper

Tools and Methods for Assessing Active Ageing and Inclusion: The Rima Experimental Project



4/2025

Lisa Sella
Nicola Pollo
Valentina Lamonica

CNR IRCrES
Istituto di Ricerca sulla Crescita Economica Sostenibile

ISSN (online) 2421-7158
ISSN (print) 2421-6798

Direttore	Elena Ragazzi
Direzione	CNR-IRCrES *Istituto di Ricerca sulla Crescita Economica Sostenibile* Strada delle Cacce 73, 10135 Torino, Italy Tel. +39 011 3977612 segreteria@ircres.cnr.it www.ircres.cnr.it
Sede di Roma	Via dei Taurini 19, 00185 Roma, Italy Tel. +39 06 49937809 / Fax +39 06 49937808
Sede di Milano	Via Corti 12, 20121 Milano, Italy Tel. +39 02 23699501 / Fax +39 02 23699530
Sede di Genova	Corso Ferdinando Maria Perrone 24, 16152 Genova, Italy Tel. +39 010 6598798

redazione@ircres.cnr.it
https://www.ircres.cnr.it/produzione-scientifica/

CNR-IRCrES Working Paper 4/2025

Tools and Methods for Assessing Active Ageing and Inclusion: The Rima Experimental Project*

LISA SELLA[a], NICOLA POLLO[b], VALENTINA LAMONICA[a]

[a]Research Institute on Sustainable Economic Growth (IRCRES), National Research Council, Italy
[b]University of Modena and Reggio Emilia, Italy

corresponding author: valentina.lamonica@cnr.it

ABSTRACT
Knowledge on the detrimental effects of sedentary lifestyle have pushed European healthcare systems to experiment with Adapted Physical Activity (APA) interventions for elderly people, to support active aging and to reduce pressure on the national healthcare system. For the elderly, a sedentary lifestyle also has implications in terms of isolation and social exclusion. However, a clear assessment of the multifaceted impact of APA programs is currently lacking.
This paper presents an experimental design for a mixed-method evaluation of the manifold impacts of an APA program developed in collaboration with the Local Health Authority (LHA) of an area in the Piedmont region (Italy), in order to test the effectiveness of the protocol to support active aging. The evaluation design follows a mixed methods strategy, with the twofold objective: to analyze the socio-psychological and physical benefits of the APA protocol, and to develop a cost-benefit analysis to assess the impact on the healthcare system. The final aim of the evaluation is to provide strategic information for planning activities to promote active aging in the LHA and to extend the recommendation of the protocol to regional and national stakeholders.

KEYWORDS: health care system, active ageing, inclusion, Randomized Control Trial, mixed methods.

DOI: 10.23760/2421-7158.2025.004
ISSN (online): 2499-6661

HOW TO CITE
Sella, L., Pollo, N. & Lamonica, V. (2025). *Tools and Methods for Assessing Active Ageing and Inclusion: The Rima Experimental Project* (CNR-IRCrES Working Paper 4/2025). Istituto di Ricerca sulla Crescita Economica Sostenibile. http://dx.doi.org/10.23760/2421-7158.2025.004

* Aknowledgement: Nicola Pollo's research grant and RIMA project are funded by Fondazione Compagnia di San Paolo. The authors acknowledge the fundamental contribution in RIMA design and implementation by ASLTO4 (Giorgio Bellan, Paola Berruto, Carla Francone, Annalisa Coppo), UISP Ciriè Settimo Chivasso (Roberto Rinaldi, Marina Ottino, Ferruccio Flavio Valzano), UISP Ivrea Canavese (Aldo Cecone) and dott. Maurizio Gottin.

CONTENTS

1. THEORETICAL BACKGROUND: BENEFITS OF ACTIVE AGING APPROACHES TO CONTRAST SEDENTARY LIFESTYLES

The aging population and the spread of sedentary lifestyles pose significant challenges for national healthcare systems. Italy faces a growing elderly population: over-60 people are projected to increase from 24.3% in 2000 to 46% by 2050 (Panella, 2011). While changing demographic trends is difficult, promoting physical activity can mitigate the health impacts of sedentary lifestyles.

In fact, physical activity is known to benefit individual health, yet its effects on the elderly are not widely recognized. Hamilton et al. (2007) identified a link between sedentary time and health conditions like type 2 diabetes and cardiovascular diseases.

Sedentary behavior, defined as low-energy activities like sitting and watching TV (Pate et al., 2008), has gained attention for its impacts on health (Biddle, 2007). Promoting an active lifestyle and reducing sedentary time are essential, especially for the elderly. According to the World Health Organization, physical activity lifestyle includes at least 150 minutes of moderate or intense activity per week (WHO, 2020). Physical activity reduces the risk of chronic diseases, premature death, osteoporosis, falls, and improves mental well-being[2]. Increased physical activity, particularly through structured rehabilitation programs, has shown benefits for chronic conditions like chronic obstructive pulmonary disease (Jácome & Marques, 2016) and heart disease (Anderson et al., 2016; Soto-Rodriguez et al., 2024), including fewer hospitalizations and improved quality of life. Physical exercise can be as effective as medication for some chronic diseases, as found in the meta-analysis by Naci and Ioannidis (2013). It benefits mortality in coronary heart disease, stroke rehabilitation, heart failure, and diabetes prevention (Haseler et al., 2019).

For the elderly, maintaining muscle strength and balance is crucial for preventing frailty and improving life quality. Strength and balance are linked to reduced cardiovascular mortality, fewer hospitalizations, better mental health, and decreased fall risk (Cooper et al., 2010). Improved fitness through targeted exercises also reduces dementia risk (McNally et al., 2017).

Hence, sedentary behavior and physical activity significantly impact health. More research is needed to fully understand these effects and develop targeted interventions. While physical activity is generally beneficial (Garber et al., 2011), it must be prescribed carefully, considering individual limits, especially for the elderly and those with chronic conditions (WHO, 2010). Specific exercise prescriptions should address potential contraindications, such as increased cardiovascular demand in unstable angina or severe hypertension (Hasenblas et al., 2017).

An example of exercise prescription that takes specific health conditions into account is Adapted Physical Activity (APA), that is particularly effective for promoting healthy active aging in vulnerable individuals, such as the elderly, disabled, and ill. According to the European protocol ADAPT, that provides a set of guidelines aimed at ensuring the most suitable (least restrictive) environment for people who need physical exercise, APA involves tailored group activities that modify lifestyles to prevent chronic diseases and integrate people with disabilities into sports events (https://www.adapt-europe.org/). APA programs simplify healthcare tasks and encourage lifelong participation in physical activities. These interventions aim to enhance life quality by fostering cooperation, improving physical fitness, promoting independence, facilitating socialization, empowering individuals, ensuring personal satisfaction, and alleviating issues like anxiety and depression (Panella, 2011). The Italian Ministry of Health's guidelines from May 29, 2017, mandate that APA exercises be part of non-medical, evidence-based programs tailored to the functional conditions of participants.

[2] See Istituto Superiore di Sanità, Epicentro ISS. https://www.epicentro.iss.it/PASSI/indicatori/attivit%C3%A0Fisica#:~:text=1%29%20Persona%20fisicamente%20attiva%3A%20%C3%A8%20una%20persona%20che%3A,di%2020%20minuti%20per%20almeno%203%20giorni%20settimanali

A study by Morey and colleagues (1996) over five years confirmed improvements in these capacities among elderly participants. Enhanced capacities help prevent falls, a major risk for the elderly, and improve mobility.

Physical exercise also boosts psychological well-being. Delle Fave et al. (2018) found that participants in two APA programs (OsteoFit) reported better emotional regulation and higher emotional well-being. Moderate physical activity promotes mental health and provides socialization opportunities, challenging the view of old age as mere decline.

Subjective vitality, the conscious experience of possessing energy and liveliness (Ryan & Frederick, 1997), helps the elderly maintain an active life both physically and socially, potentially delaying physical and cognitive decline associated with aging (Hertzog et al., 2008). A cross-sectional study by Cachioni et al. (2019) investigated variables (age, gender, education level) influencing life satisfaction in the elderly. Life satisfaction was measured using a General Life Satisfaction Scale. Except for education level, elderly participants were statistically similar regarding other socio-demographic variables and well-being, suggesting that factors like age, gender, and time spent at the University of the Third Age did not significantly impact their overall well-being. Hence, it appears that elderly individuals who focus their emotional and cognitive energy on positive aspects of life, such as engaging in activities that bring joy and fulfillment, tend to experience higher levels of well-being (Cachioni et al., 2019). Therefore, supporting approaches that enhance subjective vitality is crucial for maintaining physical and cognitive functions among the elderly.

2. AN EXPERIMENTAL EVALUATION OF THE APA IMPACT: THE RIMA PROJECT

To contrast elderly's fragility, recent literature proposes a "proactive" approach, where the elderly meet the health institution before their frailty becomes explicit, in order to prevent rather than take care of the discomfort of possible illness (Swan et al., 2008; Zhaokang et al., 2012; Ippoliti et al., 2018a-b).

Following this approach, the Azienda Sanitaria Locale Torino 4 (ASLTO4), i.e. the Local Health Authority of the north-west area near Turin (Piedmont, Italy) promotes an active aging program targeting over-64 population, based on an APA protocol of non-medical anaerobic exercises to be performed in small groups, specifically designed for elderly non active people with chronic diseases and aimed at their lifestyle modification for primary and tertiary prevention of disability. To facilitate the wide spreading of the program, ASLTO4 developed an organizational network involving territorial municipalities that offer public gyms, and a local sport promotion organization targeting sport for all activities (UISP Unione Italiana Sportpertutti) offering instructors with specific APA training. This peculiar model guarantees affordable costs for the elderly and the long-term sustainability of the program. Apart from impacts on physical health, this program is specifically designed to take care of social inclusion of the elderly, because of its collective dimension. However, to recommend its adoption to the nearby LHAs, as well as to regional and national health authorities, an evaluation of its multifaceted impact is needed.

Based on the ASLTO4 experience, RIMA (*Ricerca In Movimento per gli Anziani - research on the move for the elderly*) is an experimental research project designed with two evaluation objectives:

- To analyze the effectiveness of the APA protocol as a preventive health tool for the elderly, focusing both on the mental and physical benefits of practicing activities promoting active aging.
- To develop a cost-benefit analysis based on the estimated impact to provide local and higher-level health authorities with strategic information useful in planning health promotion activities for the elderly.

The research responds to ASLTO4 specific knowledge needs and aims to assess the impact of the APA protocol on the psychophysical conditions of over-64 users by analyzing three key dimensions for health in old age, related to non-active lifestyle, and eventually to post-traumatic immobility states and chronic neurodegenerative diseases (e.g., Parkinson's and Alzheimer's) in their early stages:

- Recourse to pharmacological prescriptions (e.g. anti-inflammatory drugs, gastroprotectants, etc.);
- Recourse to medical services (e.g. physiatrist examinations, physiotherapy services, etc.);
- Psycho-physical well-being (self-assessment by the user and hetero-assessment by the instructor).

Adopting a randomized controlled trial approach (Gerber and Green, 2012), RIMA will contribute to uncover the multidimensional impact of the APA protocol on users' psychophysical conditions. The experiment involves about 120 new users (over-64 non-active people with non-acute musculoskeletal chronicity) randomly assigned into a treatment group (61) and a control group (56). The treated receive an APA course provided by UISP instructors for an 8 months period, while the control receive a placebo health education treatment (information sessions on active lifestyle provided by ASLTO4) during the experiment and the APA course at the end of the project.

RIMA participants are volunteers selected by ASLTO4 nurses and monitored at the beginning and at the end of the experimental period, to assess statistically significant improvement in a set of indicators proxying the three key dimensions of well-being in old age. Following a mixed methods approach, qualitative investigation will complement quantitative analysis, with the aim to focus on well-being and social inclusion aspects that are difficult to measure by quantitative methodologies (Campagnolo, 2006), particularly when the treatment period is short, as in the present case.

3. RIMA TOOLBOX

3.1. Motivation and description

The data collected during the experimental phase will allow for the scientific quantification of the benefits of the APA protocol for users. For the effects of the APA protocol adopted in the RIMA project, improvements are expected in physical, psychological, and social dimensions. Hence, a set of quantitative tests and indicators referring to these dimensions has been selected based on the literature.

Physical exercises refer to repetitive, structured, and organized movements aimed at improving or maintaining physical fitness. According to Panella (2004), the main capacities targeted by APA to enhance physical well-being and maintain autonomy are:

- **Aerobic**: exercises where major muscle groups move rhythmically for extended periods;
- **Resistance**: exercises where muscles work against applied force or weight;
- **Flexibility**: activities to maintain or increase the range of motion (ROM) of joints;
- **Balance**: activities to strengthen lower body parts and reduce fall risk.

To measure differences along these physical wellness dimensions, a set of six tests has been selected:

Strength Grip Test: measures the maximum strength of the hand and forearm muscles using a hand dynamometer. Normative reference values and equations for individuals aged 18 to 85 residing in the United States are provided by Wang et al. (2018).

Stand Up Test: assesses lower body strength and endurance by counting how many times an individual can stand up from a seated position in a chair within a 30-second period. Normative scores for community-residing adults aged 60 to 94 are detailed by Rikli and Jones (1999b).

Six Minutes Walk Test: measures the distance an individual can walk in six minutes as a test of aerobic capacity and endurance. Normative scores for community-residing adults aged 60 to 94 are provided by Rikli and Jones (1999b).

Time Up and Go Test: evaluates mobility, balance, walking ability, and fall risk. It measures the time taken for an individual to stand up from a chair, walk three meters, turn around, walk back, and sit down. Normative scores for community-residing adults aged 60 to 94 are detailed by Rikli and Jones (1999b).

Lower Flexibility, Seat and Reach Test: assesses lower body flexibility, particularly the flexibility of the lower back and hamstrings. Participants sit on the floor with legs extended and reach forward as far as possible. This test is discussed by Milanovic et al. (2013).

Upper Flexibility, Back Scratch Test: measures upper body flexibility, specifically the ability to bring the hands together behind the back, one over the shoulder and the other up the middle of the back. This test is detailed by Milanovic et al. (2013).

To evaluate the improvement in the psychological dimension of APA, a validated version of the Subjective Vitality Scale (SVS) from Ryan, R. M., & Frederick, (1997) was used (Moè et al., 2024). Several studies have used the SVS after physical exercises for the elderly to assess the impact on well-being and health outcomes. For instance, the scale was validated by Nuno et al. (2017) in an analysis of the vitality of the Portuguese population, showing higher subjective vitality among sufficiently active individuals compared to their less active peers. Additionally, research on patients with rheumatoid arthritis demonstrated significant associations between subjective vitality and physical health indicators such as physical function and cardiorespiratory fitness, as well as psychological health measures like quality of life, fatigue, depression, and anxiety (Peter et al., 2016).

As part of RIMA, the SVS included a set of 6 questions to investigate the state of psychological well-being. Participants were asked to rate the extent to which they agreed with statements aimed at defining their psychological state addressing their levels of vitality, energy, willingness to live, and awakeness. The response options ranged on a scale from 1 (not at all true) to 7 (extremely true), indicating the lowest level of satisfaction and the highest level of well-being.

Furthermore, social support emerging from the collective dimension of APA activities has been positively correlated with subjective vitality among the elderly (Carrapatoso et al., 2018). When social support increases, so does subjective vitality. Leisure time offers the elderly opportunities to interact with family and friends (Chang, 2017). This positive correlation was highlighted by Chang and Kao (2019) in a study evaluating the benefits of leisure education for the elderly. The program aimed to improve participants' attitudes, knowledge, and leisure skills, enabling them to use their leisure time more effectively (Sivan & Stebbins, 2011), thereby helping the elderly receive social support.

To assess improvements in the social dimension, the RIMA toolbox includes four questions aimed at verifying:

- Increased participation in social activities such as volunteering or other activities with the elderly;
- Individual participation in outings with other elderly individuals;
- Contact via chat or phone with the elderly with whom they have relationships;
- Attendance at associations, clubs, parishes, etc.

Participants in the project are also asked for information regarding medical performance, drug consumption, weight and height (to quantify the BMI index), and saturation level. The questions are also aimed at focusing participants on their daily perceived level of pain, quantifying it using the Visual Analog Scale (VAS), a standardized method used to subjectively assess the intensity of pain. These questions cover the number of physical medicine and orthopedic medical visits, physical therapy sessions (physiotherapist/osteopath) in the last six months, and the use of anti-

inflammatory and/or pain-relieving drugs along with gastroprotective agents in a week. Apart from assessing the effectiveness of APA on the key dimensions of well-being in old age, these data are useful to conduct a cost-benefit analysis to evaluate the potential reduction of burden on the health care system resulting from an improvement in the physical condition of the elderly population due to APA programs.

3.2. The RIMA experiment: Where are we now?

The RIMA project started in January 2020, but the Covid emergence stopped the experiment in its early stages. The experimental design was periodically re-discussed during the next three years and finally re-adapted to start in early Fall 2023. For this reason, the RIMA experiment is currently ongoing: the treatment period ends in Summer 2024, and no preliminary result can be investigated here.

RIMA initial design was based on a 15-month experimental period and involved general practitioners in participants' selection. However, the final design is based on a sensibly shorter experimental period (8 months), and the participants' selection is carried out by ASLTO4 family and community nurses (Della Fiore et al., 2022) based on the RIMA inclusion protocol designed by the physiatrist service. Finally, 129 over-64 participants were selected from the north-west area near Turin (Piedmont, Italy), partly residing in urban and periurban areas (80), partly in inner rural areas (49). They voluntarily joined the program and were randomly assigned to treated and control groups, based on territorial proximity criteria.

The treated started APA activity two hours per week in their area of residence, sometimes being integrated in existing APA groups, sometimes forming a new group. All groups are led by UISP instructors specifically trained to APA protocols. The family and community nurse service is also responsible for administering the placebo health education treatment to the control groups as well as the set of RIMA tests (see section 3.1) to both the treated and control groups in the pre- and post-treatment periods.

Comparing test outcomes between the two experimental groups should measure the impact of APA on the three key dimensions for health in old age. Randomized inferential techniques will be applied to get rid of the small sample size (Gerber and Green, 2012; Athey and Imbens, 2017).

4. NEXT STEPS: A MIXED METHODS APPROACH

The last step of our evaluation process consists of integrating the results emerging from the counterfactual analysis with qualitative techniques and methods. The mixed methods approach (Creswell, 2014) is necessary to analyze the complex and multifaceted psychosocial dimensions of well-being. Literature provides evidence regarding the effectiveness of the subjective vitality scale (Frederick et al., 1997) in supplying information regarding the psychological health status of the elderly. Although there is evidence describing significant associations between subjective vitality and measures of psychological health (Rouse et al., 2015), such as perception of quality of life, depression and anxiety states, this measure is not sufficient to detect the effects of the programs on social dynamics such as inclusion, social support and emotional wellbeing. Participation in APA programs could in fact produce an increase in perceived well-being thanks to the strengthening of social relationships, which in this phase of life tend to be less and less stable.

Through qualitative tools, we will conduct focus groups with both treated and control groups, and we will deepen specific aspects of the intervention. In fact, those techniques are essential to explore the social dynamics arising from the APA program, giving voice to the direct beneficiaries. We will focus on the effects of the APA program in terms of relational networks of elderly people, and we would like to deepen the concept of social support, analyzing if people involved in the trial strengthen their social capital.

The quantification of the effects of the APA protocol on the elderly will be a multilevel process that will bring together: the data collected through tests to verify physical improvement, the data on drug consumption, and the narratives on psychosocial well-being emerging from the focus groups. The empirical analysis intends to verify the APA effectiveness for the general improvement of the lives of the elderly, which is precisely why the analysis conducted with mixed methods is the best strategy to understand the results that emerged.

5. Conclusions

This paper presents the evaluation design of an experimental Adapted Physical Activity (APA) program developed in collaboration with the Local Health Authority (LHA) of an area in the Piedmont region (Italy). The aim is to investigate the effectiveness of the protocol as a primary prevention policy to support active aging. The experimental evaluation design follows a mixed methods strategy, with the twofold objective: to analyze the socio-psychological and physical benefits of the APA protocol, and to eventually develop a cost-benefit analysis to assess the impact on the healthcare system. The final aim of the evaluation is to provide strategic information for planning activities to promote active aging in the LHA and to extend the recommendation of the protocol to regional and national stakeholders.

The research design, the experimental protocol, and its practical implementation were developed by an interdisciplinary group of researchers, health and sport professionals from the Italian National Research Council, the Local Health Authority ASL Torino 4, the national sport association UISP Unione Italiana Sportpertutti of the corresponding territories (Ciriè-Settimo-Chivasso and Ivrea Canavese). Specifically, the research group expects to find positive impacts of the APA protocol on both physical and psychological wellbeing of the treated with respect to the control group. Since significant improvement in wellbeing is very hard to measure in such a short period (8 months), the research design integrates quantitative and qualitative analysis to investigate the manifold aspects of the elderly's wellbeing affected by APA programs.

6. References

Anderson L, Oldridge N, Thompson DR, et al. (2016, Jan.). Exercise-based cardiac rehabilitation for coronary heart disease: Cochrane Systematic Review and Meta-Analysis. *Journal of the American College of Cardiology*, 67(1), pp. 1-12.

Athey, S., & Imbens, G.W. (2017). The state of applied econometrics: Causality and policy evaluation. *Journal of Economic perspectives*, 31(2), pp. 3-32.

Biddle S.J.H. (2007) Sedentary behavior. American Journal of Preventive Medecine, 33(6), pp. 502-504

Cachioni, M., Delfino, L.L., Yassuda, M.S., Batistoni, S.S.T., Melo, R.C. de, & Domingues, M.A.R. da C. (2017). Subjective and psychological well-being among elderly participants of a University of the Third Age. *Revista Brasileira de Geriatria e Gerontologia*, 20(3), pp. 340-351. doi:10.1590/1981-22562017020.160179.

Campagnolo, M. (2006). I focus group come strumento di rilevazione della qualità percepita. *Salute e società*, suppl.1, MANCANO LE PAGINE.

Carrapatoso, S., Cardon, G., Van Dyck, D., Carvalho, J., & Gheysen, F. (2018). Walking as a mediator of the relationship of social support with vitality and psychological distress in older adults. *Journal of Aging and Physical Activity*, 26(3), pp. 430-437.

Chang, L.-C., & Kao, I.-C. (2019). Enhancing social support and subjective vitality among older adults through leisure education. *International Psychogeriatrics*, 31(12), pp. 1839-1840. doi:10.1017/S1041610219000103.

Cooper R, Kuh D, Hardy R, Group, MRMortality Review GroupFALCon and HALCyon Study Teams. (2010, Sep. 9). Objectively measured physical capability levels and mortality:

systematic review and meta-analysis. British Medical Journal, 341, c4467. doi: 10.1136/bmj.c4467 20829298

Creswell, J.W. (2014). *A concise introduction to mixed methods research*. SAGE publications.

Dellafiore, F., Caruso, R., Cossu, M., Russo, S., Baroni, I., Barello, S., ... & Arrigoni, C. (2022). The state of the evidence about the family and community nurse: a systematic review. *International Journal of Environmental Research and Public Health*, 19(7), 4382.

Delle Fave, A., Bassi., M, Boccaletti., E.S., Roncaglione, C., Bernardelli, G., Mari, D. (2018). Promoting Well-Being in Old Age: The Psychological Benefits of Two Training Programs of Adapted Physical Activity. *Front Psychol*. 28(9), 828. doi: 10.3389/fpsyg.2018.00828. PMID: 29910755; PMCID: PMC5992429.

Garber, C.E., Blissmer, B., Deschenes, M.R., et al. (2011, Jul.). American College of Sports Medicine. American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Med Sci Sports Exerc* 43(7), pp. 1334-1359. doi: 10.1249/MSS.0b013e318213fefb pmid:21694556.

Gerber, A.S., & Green, D.P. (2012). *Field experiments: Design, analysis, and interpretation*. W.W. Norton & Co.

Hamilton, M.T., Hamilton, D.G., Zderic, T.W., (2007). Role of low energy expenditure and sitting in obesity, metabolic syndrome, type 2 diabetes, and cardiovascular disease. *Diabetes*, (56)11, pp. 2655-2667. doi: 10.2337/db07-0882

Haseler, C, Crooke, R, Haseler, T. (2019, Sep 17). Promoting physical activity to patients. *British Medical Journal*, 366, l5230. doi: 10.1136/bmj.l5230. PMID: 31530549.

Hasenblas, H.A., Schreiber, K., Smoliga, J.M. (2017). Addiction to exercise. *British Medical Journal*. 357. https://www.jstor.org/stable/26944211

Hertzog, C., Kramer, A.F., Wilson, R.S., & Lindenberger, U., (2008). Enrichment Effects on Adult Cognitive Development: Can the Functional Capacity of Older Adults Be Preserved and Enhanced? *Psychological Science in the Public Interest*, 9(1), pp.1-65. doi: 10.1111/j.1539-6053.2009.01034.x.

Ippoliti, R., Allievi, I., Falavigna, G., Giuliano, P., Montani, F., Obbia, P., Rizzi, S., Moda, G. (2018a). The sustainability of a community nurses programme aimed at supporting active ageing in mountain areas. *International Journal of Health Planning and Management*, 33(4), e1100-e1111. doi: 10.1002/hpm.2591

Ippoliti, R., Falavigna, G., Montani, F., Rizzi, S. (2018b). The private healthcare market and the sustainability of a community nurses programme based on social entrepreneurship (CoNSENSo project). *BMC Health Services Research*, 18(1), 689. https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-018-3513-z

Jácome, C., Marques, A. (2016). Short- and long-term effects of pulmonary rehabilitation in patients with mild COPD: a comparison with patients with moderate to severe COPD. *J Cardiopulm Rehabil Prev*., 36(6), pp. 445-453. 10.1097/HCR.0000000000000219 2777955

Jing, Gao. (2023). Physical exercises in the rehabilitation of sports injuries in the elderly. *Revista Brasileira De Medicina Do Esporte*, 29. doi: 10.1590/1517-8692202329012022_0712

Milanovic, Z., Jorgić, B., Trajković, N., Sporis, Pantelić, S., & James. (2013). Age-related decrease in physical activity and functional fitness among elderly men and women. *Clinical Interventions in Aging*, 549. https://doi.org/10.2147/CIA.S44112.

Morey, M.C., Pieper, C.F., Sullivan, R.J., Crowley, G.M., Cowper, P.A., & Robbins, M.S. (1996). Five-Year Performance Trends for Older Exercisers: A Hierarchical Model of Endurance, Strength, and Flexibility. *Journal of the American Geriatrics Society*, 44(10), pp. 1226-1231. doi:10.1111/j.1532-5415.1996.tb01374.x

McNally, S., Nunan, D., Dixon, A., Maruthappu, M., Butler, K., Gray, M. (2013). Focus on physical activity can help avoid unnecessary social care. *British Medical Journal (Clinical research ed.)*, 359, https://doi.org/10.1136/bmj.j4609

Moè, Cancer, A., Robba, M.P., Antonietti, A., Iannello, P. (submitted). Extraversion and Emotional Stability Shape subjective Vitality. The Mediation of Need Satisfaction. *Scandinavian Journal of Psichology*.

Naci. H., Ioannidis. J.P.A., Comparative effectiveness of exercise and drug interventions on mortality outcomes: metaepidemiological study. *British Medical Journal*, 347 https://doi.org/10.1136/bmj.f5577

Nuno, C., Couto, R., Antunes, D., Monteiro, J., Moutão, D.A., Marinho, L., & Cid, L. (2017). Validação da Subjective Vitality Scale e estudo da vitalidade nos idosos em função da sua atividade física. *Brazilian Journal of Kinanthropometry and Human Performance*, 19(3), pp. 261-269. doi: 10.5007/1980-0037.2017V19N3P261.

Pate, R.R., O'Neill, J.R., Lobelo, F. (2008). The evolving definition of "sedentary". E*xerc Sport Sci Rev*, 36(4), pp. 173-178. doi: 10.1097/JES.0b013e3181877d1a

Peter, C., Rouse, J. J., Veldhuijzen van Zanten, G., Metsios, G.S., Yu, C.-A., Ntoumanis, N., Kitas, G. D., & Duda, J. L. (2014). The subjective vitality scale is an indicator of physical and psychological health amongst rheumatoid arthritis patients. *Annals of the Rheumatic Diseases*, 73(2), 1221. doi: 10.1136/ANNRHEUMDIS-2014-EULAR.5037.

Rikli, R.E., & Jones, C.J. (1999a). Development and validation of a functional fitness test for community-residing older adults. *Journal of Aging and Physical Activity*, 6(1), pp. 27-159.

Rikli, R.E., & Jones, C.J. (1999b). Functional fitness normative scores for community-residing adults, ages 60-94. *Journal of Aging and Physical Activity*, 6, pp. 160-179.

Ryan, R.M., & Frederick, C. (1997). On energy, personality, and health: subjective vitality as a dynamic reflection of well-being. *Journal of Personality*, 65, pp. 529-565.

Rouse, P.C., Veldhuijzen Van Zanten, J.J.J.C.S., Ntoumanis, N. *et al.* Measuring the positive psychological well-being of people with rheumatoid arthritis: a cross-sectional validation of the subjective vitality scale. *Arthritis Res Ther* 17, 312 (2015). https://doi.org/10.1186/s13075-015-0827-7

Sivan, A., & Stebbins, R.A. (2011). Leisure education: definition, aims, advocacy, and practices–are we talking about the same thing (s)?. *World Leisure Journal*, 53(1), pp. 27-41.

Soto-Rodríguez, F.J., Moya, A.P., Bobadilla-Agouborde, C.J., Pérez-Mármol, J.M. (2024 Jun 9). Effect of Exercise Prior to Sedentary Behavior on Vascular Health Parameters. *A Systematic Review and Meta-Analysis of Crossover Trials.* Sports Medicine Open, 10(1), 69. DOI: 10.1186/s40798-024-00734-4

Swan, G.M., Selvaraj, S., Godden, D.J. (2008). Clinical peripherality: development of a peripherality index for rural health services. *BMC Health Services Research*, 8, n.p. https://core.ac.uk/download/pdf/13095562.pdf

Tajareh, R.K., Ahmadiyan, H. (2019). Investigating the relationship between optimism and subjective vitality with the mediating role of resilience among elderly people. *Journal of Psychology and Psychiatry*, 6(2), pp. 149-160. doi: 10.29252/shenakht.6.2.149

Wang, Y.-C., Bohannon, R.W., Li, X., Sindhu, B., & Kapellusch, J. (2018). Hand-Grip Strength: Normative Reference Values and Equations for Individuals 18 to 85 Years of Age Residing in the United States. *Journal of Orthopaedic & Sports Physical Therapy*, 48(9), pp. 685-693. https://doi.org/10.2519/jospt.2018.7851

World Health Organization. (2010). *Global recommendations on physical activity for health*. https://apps.who.int/iris/bitstream/handle/10665/44399/9789241599979_eng.pdf?sequence=1

World Health Organization. (2020). *Guidelines on physical activity and sedentary behaviour*. WHO. ISBN 978-92-4-001512-8 ISBN-13: 978-92-4-001513-5

Zhaokang, Y., Yuxi, L., Yong, L., Yunchang, X., Yuanjun, G., Harris, M. (2012). A model for community health service development in depressed rural areas in China. *BMC Health Services Research*, 12, 465. doi:10.1186/1472-6963-12-465

ISSN (online) 2421-7158

CNR-IRCrES Working Papers

2025

N. 3/2025 Sinfonie urbane: il ruolo della ritmanalisi nella rigenerazione degli spazi. Il caso di Piazza San Venceslao a Praga. Vittoria Virgili, Marco Marucci

N. 2/2025 From Single to Multi-Project Participation: SME Absorptive Capacity in Horizon 2020. Loreta Isaraj

N. 1/2025 Invecchiamento e welfare responsabile: la "condizione anziana" nelle periferie di Roma Capitale. Cristiana Di Pietro

2024

N. 5/2024 National frameworks for universities' community engagement: perspectives from Italy, France and the UK. Valentina Carazzolo, Ugo Finardi, Emanuela Reale, Andrea Orazio Spinello.

N. 4/2024 DAPIL – Digital archive of pilgrimage literature. Un archivio digitale per la letteratura medioevale di pellegrinaggio. Giuseppe Cuscunà.

N. 3/2024 Thesaurus e glossario ragionato della lingua della IA e della robotica. Thesaurus and reasoned glossary of AI and robotic language. Grazia Biorci.

N. 2/2024 Comprendere le trasformazioni di San Lorenzo, Roma. Un tentativo di ordine concettuale tra gentrificazione e politica urbana. Antonia Astore, Luca Tricarico.

N. 1/2024 How to measure the social acceptability of alternative environmental management solutions in wetlands and other ecosystems. Lisa Sella, Francesca Silvia Rota, Nicola Pollo.

2023

N. 5/2023 Laboratori creativi sperimentali a distanza per la valutazione. Isabella Maria Zoppi, Antonella Emina.

N. 4/2023 Eco-innovations and labor in the European automotive industry: an econometric study. Anna Novaresio.

N. 3/2023 Climate change adaptation planning: tools and methods for effective and sustainable decisions. Filippo Fraschini, Marco Pregnolato.

N. 2/2023 The effect of propensity to savings on rate of profit. Mario De Marchi.

N. 1/2023 UNESCO o non UNESCO? Quando il brand incentiva il turismo: il caso dei paesaggi vitivinicoli delle Langhe e del Monferrato. Orsola Borsani, Greta Falavigna.

2022

N. 5/2022 Logit statico, Logit dinamico e modelli hazard. Franco Varetto.

N. 4/2022 Evolution of Deep Learning from Turing machine to Deep Learning next generation. Greta Falavigna.

N. 3/2022 A Simulation Model of Technology Innovation of a Territory. Angelo Bonomi.

N. 2/2022 Technology and Environmental Policies. Angelo Bonomi.

N. 1/2022 Le donne marittime: fra stereotipi di genere, discriminazioni e scarse opportunità occupazionali. Barbara Bonciani, Silvia Peveri.

2021

N. 9/2021 Management of open access research infrastructures in large EU projects: the "CultureLabs" case. Andrea Orazio Spinello, Danilo Giglitto, Eleanor Lockley.

N. 8/2021 Francia-Italia: parole in campo. Intorno alla narrazione del Campionato del Mondo di calcio donne. Antonella Emina.

N. 7/2021 Covid-19 e rischio di insolvenza: il punto di vista del mercato azionario. Franco Varetto.

N. 6/2021 Institutional efficiency and budget constraints: a Directional Distance Function approach to lead a key policy reform. Greta Falavigna, Roberto Ippoliti.

N. 5/2021 Different waves and different policy interventions in 2020 Covid-19 in Italy: did they bring different results?. Mario Nosvelli.

N. 4/2001 On Search of a General Model of Technology Innovation. Angelo Bonomi.

N. 3/2021 Design and implementation of a web survey on the effects of evaluation on academic research. Andrea Orazio Spinello, Emanuela Reale, Antonio Zinilli.

N. 2/2021 An online survey on the effects of agile working in Italian Public Research Organisations. Serena Fabrizio, Valentina Lamonica, Andrea Orazio Spinello.

Numeri precedenti/Previous issues

Knowledge on the detrimental effects of sedentary lifestyle have pushed European healthcare systems to experiment with Adapted Physical Activity (APA) interventions for elderly people, to support active aging and to reduce pressure on the national healthcare system. For the elderly, a sedentary lifestyle also has implications in terms of isolation and social exclusion. However, a clear assessment of the multifaceted impact of APA programs is currently lacking.
This paper presents an experimental design for a mixed-method evaluation of the manifold impacts of an APA program developed in collaboration with the Local Health Authority (LHA) of an area in the Piedmont region (Italy), in order to test the effectiveness of the protocol to support active aging. The evaluation design follows a mixed methods strategy, with the twofold objective: to analyze the socio-psychological and physical benefits of the APA protocol, and to develop a cost-benefit analysis to assess the impact on the healthcare system. The final aim of the evaluation is to provide strategic information for planning activities to promote active aging in the LHA and to extend the recommendation of the protocol to regional and national stakeholders.

CNR - Consiglio Nazionale delle Ricerche
IRCrES - Istituto di Ricerca sulla Crescita Economica Sostenibile