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Integrated Training Program for Adults at EEFERP-USP: from the articulation between extension and research to outreach actions

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Abstract

The Integrated Training Program for Adults has operated since 2022 to promote physical activity (PA) in Ribeirao Preto, SP. It has developed across five areas. I) In-person promotion of PA at the School of Physical Education and Sport of Ribeirao Preto, University of Sao Paulo, Brazil. II) Health counseling delivered in a hybrid format, with monthly meetings and biweekly interactions via a messaging application. III) Outreach actions within primary and secondary health care. IV) Promotion within tertiary health care, for patients hospitalized in the Nursing Division of the Clinic Hospital (*Hospital das Clínicas*) of Ribeirao Preto. V) On social media, sharing information about accessible physical activities, without assigning blame, and considering social and environmental aspects.

Keywords: Physical training, Inclusion, Belonging, Integration, Unified Health System.

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Contextualization

The Integrated Training Program for Adults (*Programa para Adultos de Treinamento Integrado* - PrATI) is a project aimed at offering physical activity to the population of Ribeirao Preto, SP, designed to foster affinity, relaxation, a sense of belonging, and satisfaction, that is, a condition of well-being for all individuals, considering that different subpopulations face and/or perceive different barriers to practice (CROCHEMORE-SILVA *et al*., 2020; MIELKE *et al*., 2015; RECH *et al*., 2018). It is a program that originated and was consolidated based on experience from a previously conducted project, as well as partnerships, including joint action among study and research groups, and articulation with primary, secondary, and tertiary levels of care.

In August 2020, PhD Átila Alexandre Trapé was appointed at the School of Physical Education and Sport of Ribeirao Preto (*Escola de Educação Física e Esporte de Ribeirão Preto* - EEFERP), University of São Paulo (USP), and subsequently, in partnership with other faculty members (national and international), developed the research project entitled AEROBICOVID (TRAPÉ *et al*., 2021), starting in September 2020. This project aimed to analyze the effects of moderate-intensity interval training, with or without hypoxia (exposure to a lower oxygen concentration), on the health of individuals recovering from COVID-19, involving undergraduate, master's, and doctoral students.

Health monitoring was offered to 84 individuals recovering from COVID-19, of whom 59 underwent a structured physical exercise intervention. In addition to the initial characterization of the sample (CAMACHO-CARDENOSA *et al*., 2024) and the detailed description of physiological and psychophysiological responses during the intervention (COSTA *et al*., 2022a), a positive effect of the intervention on mental health and quality of life was observed (MERELLANO-NAVARRO *et al*., 2023), along with improvements in cardiorespiratory fitness, with potential additional benefits for those who trained under hypoxic conditions (DELLAVECHIA DE CARVALHO *et al*., 2023). Despite the benefits achieved after eight weeks of training, a loss of these benefits was observed after an additional eight weeks of follow-up among those who did not remain physically active, highlighting the importance of maintaining physical activity over time.

AEROBICOVID played an important role in knowledge production and in providing opportunities to treat individuals recovering from COVID-19; however, a clinical study has defined start and end dates, underscoring the need for continuous provision of physical activity (COSTA *et al*., 2022b). Therefore, in 2021, the extension project, Physical Activity in the Post-COVID Period, was developed, offering continuous physical activity to 33

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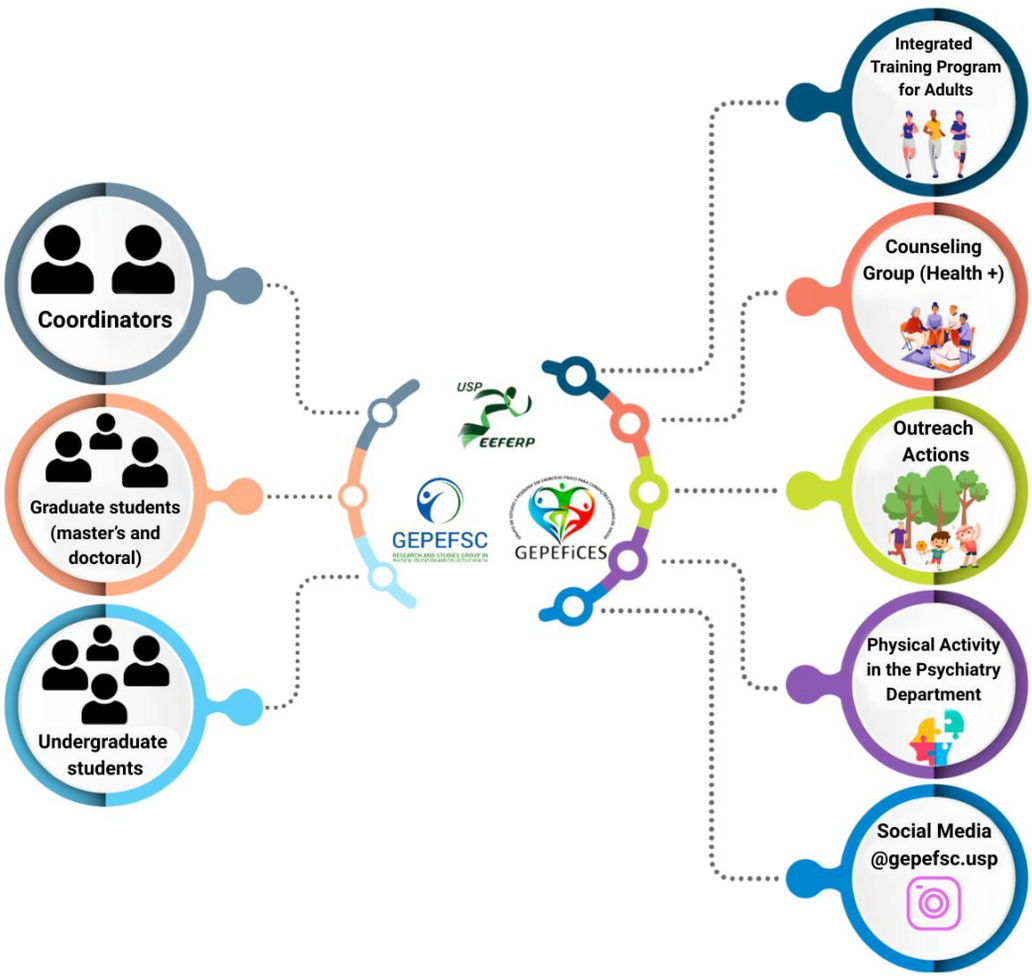
individuals recovering from COVID-19 through multicomponent activities (agility and balance, strength and endurance) performed three times per week, with an average session duration of 50 minutes. Although it was an extension project, without the same level of detailed and rigorous prescription and monitoring as the AEROBICOVID research, positive effects on physical fitness were observed, with no significant differences when comparing the extension and research projects (VALERIO; COSTA; TRAPÉ, 2024).

Similar to the AEROBICOVID research, the Physical Activity in the Post-COVID extension project promoted benefits and can also be considered a successful project. However, by 2022, after one year, a reduction in COVID-19 infections was observed. Thus, the extension project was reformulated to expand its target audience to the general population and to provide care for other special health conditions. Based on this objective, the PrATI was developed, which, in addition to offering physical activity at the EEFERP-USP facilities, also promotes it among subpopulations with access barriers through outreach actions and a counseling group (Figure 1).

Figure 1: Composition of groups and areas of action for the promotion of physical activity



Source: Author's own elaboration.

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Work Team

The extension project is jointly coordinated by PhD Átila Alexandre Trapé and PhD Camila de Moraes, leaders of the Study and Research Group on Physical Education and Collective Health (GEPEFSC) and the Study and Research Group on Physical Exercise for Special Health Conditions (GEPEFiCES), respectively, both affiliated with EEFERP-USP. Master's and doctoral students contribute by assisting in the coordination of the project and its activities, dividing their responsibilities across groups (in-person sessions at 7:00 a.m., 5:00 p.m., and 6:00 p.m.; outreach actions; and the counseling group), and serve as primary points of reference for both participants and undergraduate students. The project also receives support from two Physical Education professionals affiliated with EEFERP-USP.

Undergraduate students participate in the project as scholarship holders through the Unified Scholarship Program at USP, as interns, or as volunteers, with active involvement. They undergo training and capacity-building processes to conduct training sessions and assessments, always under the supervision of a Physical Education professional.

Physical Activity at EEFERP-USP

The promotion of physical activity at EEFERP-USP is carried out through three groups, with approximately 100 positions available for the adult population of Ribeirao Preto, São Paulo. Two groups follow a combined training model (strength and aerobic), one at 7:00 a.m. and another at 6:00 p.m.; one group follows a multicomponent training model (agility and balance, strength and endurance) at 5:00 p.m. All groups perform training sessions three times per week, on non-consecutive days, lasting 60 minutes.

Recruitment

Registration opened initially on the EEFERP website, Instagram, and WhatsApp. Following the initial call, applicants exceeding the available positions were placed on a waiting list. Every six months, a new call was made to those on the waiting list, along with the opening of new registrations to replenish it.

In the first year, recruitment included individuals aged between 18 and 64 years. In the second year, it was restricted to individuals aged 30 to 59. Currently in its third year,

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the program is established with middle-aged adults as its target population, recruiting individuals aged 40 to 59 years.

Combined Training

The combined training model is characterized by the performance of strength and aerobic endurance exercises (LEVERITT *et al.*, 1999).

The warm-up consists of dynamic stretching targeting the major joints, while the cool-down includes static stretching. Strength training comprises exercises performed using the participant's own body mass (kg) and accessories such as ankle weights, resistance bands, weighted balls, and dumbbells, which may be adapted according to each participant's physical condition and needs. The strategy involves circuit-based training, with periods of stimulus and intervals for recovery and transition between stations. Aerobic training is performed on an upright stationary bicycle, with intensity controlled by the rating of perceived exertion (RPE), ranging from continuous models at RPE 3 (moderate) to interval models with peak efforts at RPE 10 and recovery periods at RPE 2. In each training session, half of the group begins with strength exercises and the other half with aerobic exercise. In the subsequent session, the starting order is reversed, and so on.

Multicomponent Training

The multicomponent training model prioritizes agility and balance movements, in addition to strength and endurance exercises (TRAPÉ *et al.*, 2017).

The sessions are divided into four parts: (1) warm-up with low-intensity activities, including dynamic stretching, coordination and/or balance exercises, games, or sports activities (10 to 20 min); (2) strength exercises performed in a circuit format, using resistance bands, free weights, and body weight (20 to 30 min); (3) aerobic endurance, agility exercises, and recreational activities (dance, games, or sports activities) (10 to 20 min); and (4) cool-down, relaxation, and stretching exercises (5 to 10 min).

Counseling Group

This area of physical activity promotion is dedicated to health counseling, including physical activity promotion, delivered in a hybrid format with one monthly in-person

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meeting and biweekly interactions via a messaging application. This group predominantly includes individuals who are unable to participate in in-person extension activities but are interested in receiving health-related counseling.

Counseling is a strategy that mobilizes individuals' internal resources to help them recognize themselves as protagonists of their own health (SOUZA NETO *et al.*, 2020). In this sense, it is a tool that can demonstrate to individuals the benefits of lifestyle changes for health, while always considering the complexities that underlie healthy behavior, such as social and environmental determinants (SOUZA NETO *et al.*, 2020). GEPEFSC and GEPEFiCES created the counseling group "Health +" (*Saúde* +), aiming to serve individuals who face difficulties in engaging in physical activity within in-person projects. This initiative, which currently includes 20 participants and is about to begin its second cohort, holds one monthly in-person meeting and biweekly interactions via a mobile messaging application to discuss topics related to health and well-being. At each in-person meeting, a health-related topic is addressed, such as physical activity, nutrition, levels of health care, special health conditions, and medications, among others. At each meeting, a goal is proposed to participants, who may adapt it according to their own context. Subsequently, on a biweekly basis, interactions are conducted in the mobile messaging group, reinforcing and encouraging the goals set by each participant. In the week preceding the meeting (the second fortnight), questions related to the topic to be addressed in the following weeks' in-person meeting are sent so that participants can begin reflecting on the theme to be discussed.

Health Monitoring

Participants in the combined and multicomponent training programs, as well as in the counseling group, undergo health monitoring prior to initiating activities, after six months, and subsequently on an annual basis. This monitoring includes collecting information on socioeconomic status, health conditions, physical activity level, diet, mental health, perceived quality of life, cognition, anthropometry, body composition, physical fitness, hematological markers, pulmonary function, and autonomic indicators.

PAR-Q and Anamnesis

Initially, in accordance with the provisions established for individuals aged between 15 and 69 years under Sao Paulo State Law No. 16,724 of May 22, 2018, participants

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complete the Physical Activity Readiness Questionnaire (PAR-Q). Those who respond positively to any of the questions are advised to seek medical evaluation and, in order to participate in the extension activities and research, sign the Informed Consent Form and the Liability Waiver for Physical Activity Practice. An initial section of the anamnesis, consisting of open- and closed-ended questions, enables the collection of information on personal characteristics such as name, sex, race/ethnicity, age, among others. Additionally, a second section of the anamnesis allows collection of information on health history and current health status, including physical limitations, surgeries, falls, and medication use, among others.

Questionnaires

The following questionnaires are administered: the International Physical Activity Questionnaire (IPAQ), short version (MATSUDO *et al.*, 2001); the Baecke Habitual Physical Activity Questionnaire (FLORINDO *et al.*, 2004); the Food Consumption Markers Form from the Brazilian Ministry of Health, part of the Food and Nutrition Surveillance System (BRASIL, 2008); the 12-Item Health Survey (SF-12v2) instrument to assess perceived quality of life (DAMÁSIO; ANDRADE; KOLLER, 2015); the Depression, Anxiety, and Stress Scale (DASS-21) (VIGNOLA; TUCCI, 2014); as well as the Addenbrooke's Cognitive Examination-Revised (ACE-R) (CARVALHO; CARAMELLI, 2007) and the Montreal Cognitive Assessment (MoCA) (MEMÓRIA *et al.*, 2013).

Blood Pressure

Blood pressure is assessed using an automatic digital upper-arm device (OMRON, model HEM-7113), in accordance with the "Brazilian Guidelines on Arterial Hypertension – 2020" (BARROSO *et al.*, 2021).

Anthropometric, Perimetric Measures and Body Composition

Body mass and height are measured to calculate body mass index (BMI) (WORLD HEALTH ORGANIZATION., 2000), using a scale and a stadiometer (Filizola, model 31). Additionally, waist and hip circumferences are measured to calculate the waist-to-hip ratio (WHR) (ABESO, 2016). For the analysis of body composition and the distribution of lean

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mass, bone mass, and adipose tissue, dual-energy X-ray absorptiometry (GE Lunar – DPX-NT) is employed (FULLER; LASKEY; ELIA, 1992).

Physical Fitness

The motor tests are conducted in the following sequence: (i) trunk and lower limb flexibility - sit-and-reach test (RIKLI; JONES, 2008); (ii) upper limb flexibility - back scratch test (RIKLI; JONES, 2008); (iii) lower limb muscular endurance - chair stand test (RIKLI; JONES, 2008); (iv) upper limb muscular endurance - elbow flexion and extension in a seated position (RIKLI; JONES, 2008); (v) upper limb strength - handgrip strength using a dynamometer (LIMA *et al.*, 2018); (vi) agility and dynamic balance - test proposed by Osness *et al*. (1990); and (vii) aerobic endurance - six-minute walk test (RIKLI; JONES, 2008).

Hematological Indicators

Participants' hematological data are obtained via peripheral venous access after an eight-hour fast, procedures performed by a nurse. Variables assessed include complete blood count parameters, glucose, C-reactive protein, and lipid profile variables: total cholesterol, triglycerides, LDL-c, and HDL-c.

Spirometry

For the assessment of lung volumes, flow rates, and capacities, a portable computerized spirometer (Sp10, Contec Medical Systems, Qinhuangdao, China) is used, in accordance with the guidelines of the American Thoracic Society and the European Respiratory Society (ATS/ERS) (MILLER *et al.*, 2005).

Autonomic indicators

This assessment is performed with the participant lying supine on a stretcher, awake, in a calm, quiet environment at 23°C for 10 minutes while breathing normally. To determine autonomic variables, heart rate variability (HRV) is analyzed using beat-by-beat data to calculate RR intervals (RODRIGUES *et al.*, 2017).

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Outreach Activities

Outreach Actions

These actions have been carried out at least once per month and may occur more frequently depending on the demands received, as well as the articulations and partnerships established. These activities take place in waiting rooms or alternative spaces during specific campaigns at Family Health Units and Centers in the Western District, as well as in parks and public squares within the territory covered by health services. In addition, specific demands are addressed in schools and at House Foundation (*Fundação Casa*), and partnerships are established with other projects, such as Bridges Project (*Projeto Pontes*), which provides care and support to the homeless population. The primary approach consists of group-based activities that respect and adapt to individual limitations.

Activities in the Psychiatry Department of the Clinic Hospital

The “Physical Activity in the Psychiatry Department” initiative at the Clinic Hospital *(Hospital das Clínicas)* of Ribeirao Preto is conducted weekly with hospitalized patients. Recreational activities include adapted games, playful activities, dance, and exercises that prioritize the development of coordination, balance, and dual-task performance. In addition, materials such as hoops, balls, and cones are used in the activities.

Social Media

Beyond efforts in knowledge production, there are also initiatives focused on humanized communication through social media, particularly Instagram (@gepefsc.usp), aimed at strengthening connections with society. Posts about the group's activities are regularly published. However, the primary focus is to share information that promotes engaging in physical activities individuals enjoy and that align with their possibilities, emphasizing an approach that is accessible, realistic, and considerate of social and environmental factors. Through a communication approach that avoids blaming or holding individuals solely responsible, the aim is to facilitate closer engagement with physical activity practice.

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Final Considerations

The aim is to integrate scientific and popular knowledge, promoting free access to physical activity for the population while also fostering the protagonism of those involved in the development and implementation process. In addition to this important initiative that promotes the presence of society within the University through in-person extension activities, the PrATI has also sought to bring the University into communities through outreach actions. The development of research at both undergraduate and graduate levels is also noteworthy, integrating knowledge production, teaching, and extension within this important project of GEPEFSC and GEPEFiCES at EEFERP-USP.

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Conflict of Interest

The authors declare no conflict of interest.

Data Availability Statement

All data generated or analyzed during this study are included in this published article.

Author Contributions

GPC: Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing - original draft, and Writing - review & editing.
LDD, APS, JCSO, GMLC and MMM: Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, and Writing - review & editing.
CM and AAT: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, and Writing - review & editing.

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