



HAL
open science

PERSISTE: a mixed methods protocol to identify barriers and levers to a sustainable physical activity practice among patients with chronic disease after physical activity resumption programs

Olivier Riquier, Anne Vuillemin, Aurélie van Hoyer

► **To cite this version:**

Olivier Riquier, Anne Vuillemin, Aurélie van Hoyer. PERSISTE: a mixed methods protocol to identify barriers and levers to a sustainable physical activity practice among patients with chronic disease after physical activity resumption programs. *BMJ Open Sport and Exercise Medicine*, 2022, 8 (1), pp.e001261. 10.1136/bmjsem-2021-001261 . hal-03549539

HAL Id: hal-03549539

<https://hal.science/hal-03549539v1>

Submitted on 31 Jan 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

PERSISTE: a mixed methods protocol to identify barriers and levers to a sustainable physical activity practice among patients with chronic disease after physical activity resumption programs

Olivier Riquier ,¹ Anne Vuillemin,² Aurélie Van Hoyer^{1,3}

To cite: Riquier O, Vuillemin A, Van Hoyer A. PERSISTE: a mixed methods protocol to identify barriers and levers to a sustainable physical activity practice among patients with chronic disease after physical activity resumption programs. *BMJ Open Sport & Exercise Medicine* 2022;**8**:e001261. doi:10.1136/bmjsem-2021-001261

Accepted 24 December 2021



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

¹APEMAC, Université de Lorraine, Nancy, France

²LAHMESS, Université Côte d'Azur, Nice, Provence-Alpes-Côte d'Azur, France

³Physical Education and Sport Sciences Department, University of Limerick, Limerick, Ireland

Correspondence to

Dr Aurélie Van Hoyer;
aurelie.van-hoyer@univ-lorraine.fr

ABSTRACT

Physical activity (PA) has evidence-based benefits for physical, social and mental health, but investigation of how PA interventions for patients with chronic disease affects their PA practice up to 1 year after programmes are rare. Moreover, few studies document how the context and intervention mechanisms of PA programmes affect sustainable PA practice and its determinants. The present protocol describes a mixed methods study comparing the effectiveness and conditions for the effectiveness of two PA resumption programmes (a hospital-led and a community-based programme). Using a comparative longitudinal study, 60 patients (3-month duration) will be followed for 1 year through four data collections: before (T0) and at the end (T1) of the intervention, 6 months (T2) and 1 year (T3) after the start of the programme. The primary outcome will be PA practice in min/week and categorised as light, moderate or vigorous (using International Physical Activity Questionnaire (IPAQ)), and secondary outcomes will include sedentary time in min/week (IPAQ), quality of life evaluated through the physical and mental composite scores ('Medical Outcome Study Short Form 12'), and enjoyment using four statements rated from 1 to 5, a high score being synonymous of enjoyment (Intrinsic Motivation Inventory). Qualitative data on further determinants of PA practice and intervention mechanisms will be collected. The expected results will offer the opportunity to understand how the intervention context contributes to a more effective, sustainable PA practice. Trial registration number: NCT04954209.

INTRODUCTION

In 2017 in France, 10.7 million patients (17% of the insured population)¹ were diagnosed with at least 1 of the 30 chronic diseases defined as 'diseases with an expensive and long-term treatment, which can be paid by the health insurance'.²³ Moreover, the prevalence of patients with chronic disease has increased by 4% between 2006 and 2011

Key messages

What is already known

► Physical activity (PA) has evidence-based benefits for physical, social and mental health and is an integral part of treatment for chronic diseases. Unfortunately, patients who have been sedentary or far from PA practice have difficulties sustaining this PA practice after PA resumption programmes.

What are the new findings

► This study will provide a better understanding of the intervention effectiveness of two different PA resumption programmes (hospital-led and community-based) among patients with long-term disease as well as the intervention mechanisms and determinants (psychological, social and community) of sustainable PA practice during and after these PA resumption programmes.

and 5% between 2011 and 2017.⁴ Beyond affecting individual health, chronic diseases also have high financial cost, estimated at €86 billion in 2015 in France.⁵ Furthermore, wide disparities have been observed in social⁶ and territorial¹ inequalities, with higher prevalence of chronic disease in deprived areas.

One factor playing a key role in chronic disease prevention and management is physical activity (PA). Evidence has demonstrated the benefits of PA on physical, social and mental health.⁷ As stated in the French government's guidelines,⁸ PA is now considered as an integral part of chronic disease treatment.⁹ The WHO recommends at least 150–300 min of moderate-intensity PA, or 75–150 min of vigorous-intensity PA, or an equivalent combination of moderate-intensity and vigorous-intensity aerobic activity, per week for adults in the general population and adults with chronic conditions.¹⁰

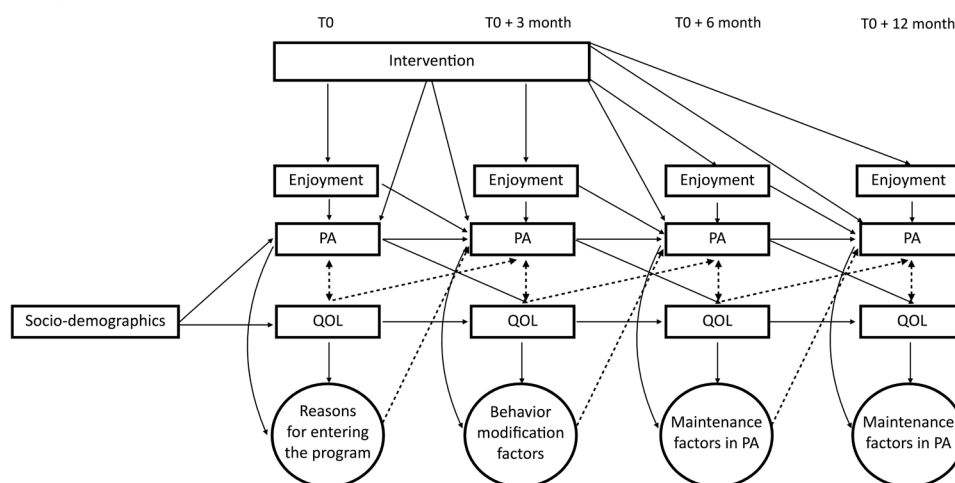


Figure 1 Presumed interactions between sociodemographics data, intervention variables, physical activity (PA), quality of life (QOL), enjoyment in PA and qualitative data from interviews.

In 2019 in France, 61% of patients were recommended to practice PA by their doctors, and 36% of these were directed toward a PA resumption programme, ‘programmes passerelles’.¹¹ Designed for people who want to maintain or improve their health by practicing PA, PA resumption programmes are defined as ‘resumption programme(s) of adapted PA, framed by professional coaches, limited in the time, aimed to improve the physical condition, to make people practicing in autonomy, safety, regularly and persistently’.¹²

Both community-based and medically supervised programmes have shown mixed results in improving sustainable PA practice. A review showed that half of included community-based PA programmes showed positive PA outcomes. A literature review of exercise referral schemes showed a significant increase in the number of sedentary people becoming moderately active but also poor participation and observance. A second review showed no long-term impact on PA practice of exercise referral schemes.^{13 14} In other words, previous studies have expressed doubts over the effectiveness of the programmes, especially because of the non-sustainability of PA practice.¹⁵

Previous studies have shown different factors affecting patients’ commitment to PA resumption programmes^{16 17}; practice conditions and motivation (eg, enjoyment, feeling of self-efficacy, quality of life); sociodemographic factors, education and knowledge (eg, benefits of PA, disease management); and medical factors (improvement of health condition, pharmaceuticals). Moreover, a literature review of programme design showed that key factors for sustainable practice were perceived support, defined goals and motivation, professional advice and supervision during and after the programme, incentives, social engagement with other participants and accessibility.¹⁵

To further contribute to the understanding of PA resumption programme mechanisms for sustainable PA practice, the present study, part of the PERSISTE project

(Promotion et pERennité de l’activité phySIque Santé—Promotion and sustainability of health enhancing PA), will compare the effectiveness (maintenance of PA practice up to 1 year after the programme) and conditions for the effectiveness (health determinants and intervention mechanisms influencing PA practice) of two PA resumption programmes (one hospital-led and one community-based) on PA practice from entering the programme to 1 year later.

Research hypothesis

To evaluate the effectiveness of PA resumption programmes, we postulate that in comparison to a hospital-led programme, a community-led programme (including discovery sessions by local sports clubs) will increase light, moderate and vigorous PA practice and organised sports activities at 6 months and 1 year after entering the programme, which in turn will increase quality of life at 6 months and 1 year after entering the programme (see figure 1). We will also conduct an exploratory analysis to examine which PA determinants (eg, enjoyment measured quantitatively via questionnaire) and PA resumption programme mechanisms (identified from the qualitative data) support sustainable PA practice.

METHODS

Research design

The present study is a multicentre, longitudinal observational comparative study with a convergent parallel mixed methods design.¹⁸ The multicentred, observational and comparative study involves observing two PA resumption programmes, the first hospital led and the second community based, without modifying or altering the ongoing programme. The design is longitudinal in that patients are followed for 1 year (T0, T0+3 months, T0+6 months, T0+12 months) (figure 2).

The design will use a parallel mixed methods QUANT+QUAL study because in the first phase,

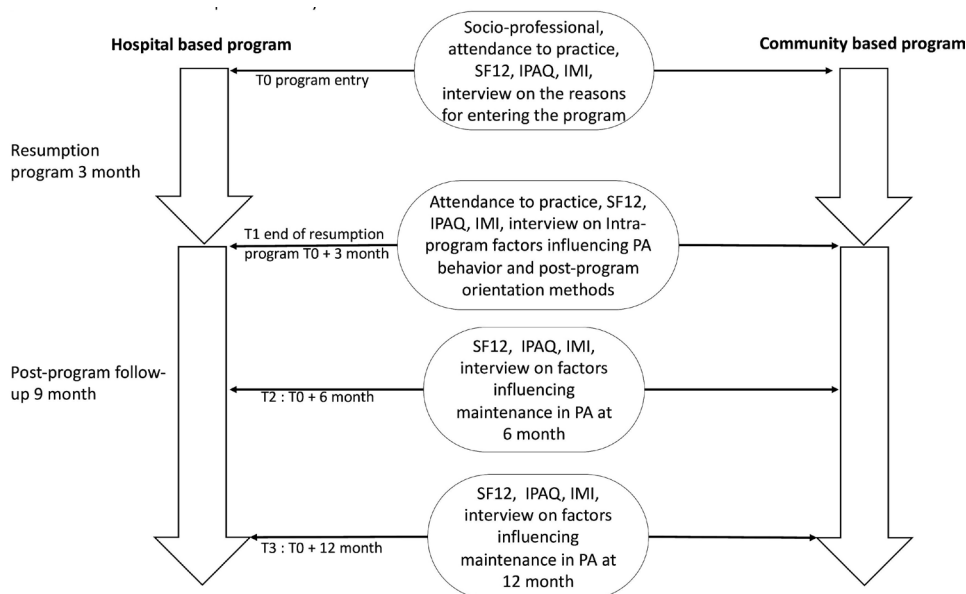


Figure 2 Scheme of the comparative study. IPAQ, International Physical Activity Questionnaire; IMI, Intrinsic Motivation Inventory; SF-12, 12-item Short Form.

quantitative data (attendance, quality of life, motivation assessed by questionnaires) and qualitative data (interviews on the reasons for continuing or abandoning PA practice) will be collected at the same time (parallel) and combined during data analysis (convergent). In other words, quantitative data will inform the PA, organised sport practice and quality-of-life evolution, whereas qualitative data will explore wider PA practice determinants and intervention mechanisms.

Study settings

The present study will be based on two PA resumption programmes implemented in Seine-Saint-Denis, a socially deprived area outside of Paris: the community-led programme Le Défi Forme Santé (DFS) in La Courneuve and a hospital-led programme in the Bondy area, at the Centre Hospitalier Universitaire Jean Verdier (CHU JV).

Both programmes target sedentary people with long-term diseases and offer a 3-month adapted PA programme. They share similar objectives: to support patient's engagement and sustainable, autonomous PA practice. Nevertheless, they differ in their content and organisation leadership. The DFS programme welcomes patients outside of a medical structure, in different community locations (indoors and outdoors), and offers activities such as muscle strengthening, aquafit sessions and Nordic walking. The programme also encourages local sports clubs to recruit participants by offering specific sessions in the programme or inviting them to practice their own sport. The CHU JV programme is fully integrated into the hospital's sports medicine and rehabilitation department. All care is provided within the hospital itself. Patients will experience cardiovascular work, muscle strengthening and other fun and play activities. In both programmes, the sessions will last from 1 to 2 hours and will be supervised by educators in adapted

physical activities and/or sport–health educators. Participants will be encouraged to practice at least three sessions per week at the JV CHU and up to five at the DFS. During the programmes and outside of the supervised sessions, participants will be encouraged to adopt an active lifestyle, but will not be especially encouraged to practice PA autonomously given the volume of supervised practice.

Sample size

The primary outcome of the study will be PA practice at 6 months and 1 year after the programme. According to preliminary data collected from 255 people for a Master 2 Sports Sciences thesis,¹⁹ 57% of the people involved in the DFS programme continued to practice PA at 6 months. From a review of the literature¹³ on the effectiveness of hospital-based PA programmes, we estimate that 20% of participants will reach the recommendations for PA practice at 6 months and 1 year after the CHU JV programme. Assuming that 57% of the DFS patients and 20% of the CHU JV patients will reach the PA recommendations, with a 5% alpha risk and a power of 80%, we will need at least 52 participants, 26 in each group (epiR package 0.9–96) to compare the two programmes. Assuming a 10% dropout rate (three patients/location) during follow-up, we can expect to include and follow a total of 60 patients, or 30 patients per programme: three patients included per month per programme for 12 months.

Recruitment

The inclusion criteria will be 18 years of age and older, having a long-term condition, enrolled in the DFS or CHU JV PA resumption programme between October 2021 and September 2022, ensured medical fitness to participate in the PA programme and being informed and giving oral consent to participate.

Table 1 Data collection and measurement of variables

	T0	T1 (T0+3 months)	T2 (T0+6 months)	T3 (T0+12 months)
Quantitative data				
Sociodemographics	X			
SF-12	X	X	X	X
IPAQ	X	X	X	X
IMI	X	X	X	X
Attendance at practice		X		
Reasons for entering the programme	X			
Qualitative data				
Intra-programme factors affecting PA behaviour and postprogramme orientation methods		X		
Factors affecting maintaining PA in the last 3 months and current practice modalities			X	
Factors affecting maintaining PA in the last 6 months and current practice modalities				X

IMI, Intrinsic Motivation Inventory; IPAQ, International Physical Activity Questionnaire; SF-12, Medical Outcomes Study 12-item Short Form.

Measurement

Individual demographic and socioeconomic criteria collected by questionnaires will include age, sex, education level, socioprofessional category, type of professional activity, marital status and socioeconomic status. Medical criteria will include the type of chronic disease. In both programmes, the primary outcome will be the amount of light, moderate and vigorous PA measured by using the International Physical Activity Questionnaire (IPAQ). The IPAQ is a validated international questionnaire that has been translated into several languages,²⁰ including French, and has been used across similar samples. The IPAQ will be used to measure PA level over the previous 7 days (in min/week and categorised as light, moderate or vigorous) based on three indicators: frequency, duration and intensity. Sedentary behaviour (in min/week) will also be measured over the previous 7 days.²¹ Secondary outcomes will include a record of attendance at sessions during the resumption programme, participation in organised sport practice and sedentary behaviour. Further secondary outcomes are quality of life and enjoyment in PA practice.

Quality of life will be evaluated by the Medical Outcomes Study 12-item Short Form (SF-12) questionnaire, validated at the international level, including in French.²² The SF-12 questionnaire is a general health assessment questionnaire evaluating two dimensions: the physical composite score and the mental composite score divided into eight subdimensions (PA; life and relationships with others; physical pain; perceived health; vitality; limitations due to mental state; limitations due to physical state; mental health) and questions the individual about the last 4 weeks.

Enjoyment in PA will be measured by using the Intrinsic Motivation Inventory (IMI) Questionnaire. This scale, not validated in French but used in different studies²³ among the sport population, determines the enjoyment in the practice of PA over a given period. Using four statements (eg, 'I liked the activities I did'), responses are rated on a scale of 1–5, from 1, 'strongly disagree', to 5, 'strongly agree'. A high score indicates a high level of enjoyment of PA.

Further PA determinants investigated by interview will include reasons for entering the programme, intraprogramme factors that modified PA behaviour (pedagogy, timeframe, relationships etc), territorial characteristics affecting PA practice, and qualitative information on the practice of PA after the programme (type of activity, autonomous, supervised, in which structure).

Data collection

Data will be collected at inclusion (T0, at enrollment in the PA resumption programme), at 3 months (end of the bridging programme), and at 6 and 12 months after inclusion. Data will be recorded in each participant's individual tracking book, and semistructured interviews will be recorded.

Inclusion in the study (T0) will be performed by the sport–health educator at the time of enrolment in the PA resumption programme. The study will be presented to patients who meet the inclusion criteria. The sport–health educator will inform the patient and orally collect the patient's non-opposition to participate as well as non-opposition to use of the patient's data. If the patient agrees, the sport–health educator will collect sociodemographic data and administer the IPAQ, IMI and SF-12. The patient will then be informed of a future face-to-face or telephone appointment for a semistructured individual interview with the principal investigator about the reasons for entering the programme. The patient will be given a letter of information in the follow-up booklet on the progress of the study along with the contact details of the principal investigator of the research. A similar procedure will apply at each data collection, including questionnaire collection by the programme educator and interview with the principal investigator (see [table 1](#) for details).

Data analysis

A descriptive analysis will be performed for all variables collected at each measurement time. Univariate and multivariate analysis of variance (ANOVA and MANOVA) will be used for comparing the two programmes, controlling for confounders and statistical assumptions to run such analysis. Specifically, ANOVA and MANOVA will be used to compare light, moderate and vigorous PA; sedentary time; and compliance with the programme. A similar analysis will be used for secondary outcomes (quality of life, enjoyment). PA trajectories will be identified, to examine PA profiles of patients through time, in particular at the four times (T0, T1 (T0+3 months), T2

Table 2 Description of the mixed method design

	CHU JV programme				DFS programme				
	Quantitative study		Qualitative study		Quantitative study		Exploratory question		
	Practice of PA, quality of life, enjoyment	Factors affecting PA practice	Practice of PA, quality of life, enjoyment	Factors affecting PA practice	Practice of PA, quality of life, enjoyment	Factors affecting PA practice	Effect of the discovery sessions	Material	
	Procedure	Material	Procedure	Material	Procedure	Material	Procedure	Material	
Data collecting	Record of attendance/administration of questionnaires	Digital data	Semistructured interviews	Textual data	Record of attendance/administration of questionnaires	Digital data	Semi-structured interviews	Textual data	
Analysis	Descriptive analysis	Multivariate descriptive analysis, structural equations	Analysis of contents	Themes	Descriptive analysis	Multivariate descriptive analysis, structural equations	Analysis of contents	Themes	
	Procedure Interpretation and explanation of quantitative and qualitative results Exploration of factors affecting PA practice based on quantitative outcomes		Product Identification of barriers and levers to PA practice after resumptive programmes		Data integration		Procedure Interpretation and explanation of quantitative and qualitative results Exploration of factors affecting PA practice based on quantitative outcomes		Product Identification of barriers and levers to PA practice after resumption programmes/effect of discovery sessions

CHU JV, Centre Hospitalier Universitaire Jean Verdier; DFS, Défi Forme Santé; PA, physical activity.

(T0+6 months), T3 (T0+12 months)), by investigating PA, quality of life and enjoyment using a ‘latent class growth analysis’ method. This will permit factors determining whether individuals meet PA recommendations or not to be identified. The relations between the variables (as shown by figure 1) will be modelled by structural equation modelling by using AMOS software.

The qualitative data analysis will help refine the determinants of continued PA practice (see table 2 for details) by using a thematic coding and if necessary, quantification of qualitative data.²⁴ Interviews will be fully transcribed, and a thematic content analysis will involve using Nvivo software.

The integration of qualitative and quantitative data will include the use of quantitative data as a basis for the qualitative study. In addition, the qualitative data from the exploratory question will be used to complete the analysis in order to specify the effect of discovery sessions organised by local sport clubs on the DFS resumption programme.

DISCUSSION

There has been a recent development of PA resumption programmes in France.²⁵ However, mixed results from previous literature reviews^{12–15} limit the ability to understand the effectiveness of such programmes, or how they can be implemented effectively to support sustainable PA practice in patients with chronic disease. Considering the evidence-based benefits of PA and its recognition as treatment for chronic conditions,⁸ understanding how PA determinants and the intervention context could best support patient long-term engagement remains a challenge. Recent research has focused on community-based²⁶ or hospital-based²⁷ PA programmes, but the present work is unique in comparing how these settings could support sustainable PA practice. The mixed methods protocol, based on the experience of patients in two PA resumption programmes, should allow for identifying wider political, social, territorial, psychological PA determinants as well as the intervention and contextual mechanisms affecting sustainable PA practice. The collection of quantitative and qualitative data should allow for better coverage of the plurality of factors, for a whole systems approach, not just focusing on the individual level.¹⁵ The analysis of the data should highlight the interactions between the determinants from the individual to settings as well as their effects and interactions over time. The results of the study should allow for understanding which PA resumption programmes work, for whom and how, to support sustainable PA practice.

Acknowledgements The authors acknowledge the surgeons responsible for the two programmes, Anne-Louise Avronsart and François Lhuissier; and the main sport and health educators, Lamine Camara, Romain Yhuel.

Contributors OR, AVH and AV made substantial contribution to the conception of the design of the protocol and gave feedback on the manuscript. OR, AVH and AV read and approved the submitted version of the manuscript.

Funding This project was funded by the “Comité Départemental Olympique et Sportif de Seine Saint Denis”. The funding is dedicated to project management, data collection and analysis. Intellectual properties belong to the research team

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The French National Person Protection Committee (Comité de Protection des Personnes) has approved the study (protocol no. 2021-A01863-38). Before filling out the questionnaires, participants will read the letter of information about the study on the first page, and will give their written passive consent (using the following statement: ‘by filling this questionnaire you agree that your data could be used for the present research’) to participate in the questionnaire leaflet directly. In addition, before starting the interviews, their oral active consent will be collected through the question: ‘do you agree to respond my questions and to be recorded’? Participants will be informed that they can drop out of the study at any time without consequences.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement No data are available. Study is about to start.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

ORCID iD

Olivier Riquier <http://orcid.org/0000-0002-3996-5075>

REFERENCES

- Définition de l’ALD. Available: <https://www.ameli.fr/medecin/exercice-liberal/prescription-prise-charge/situation-patient-ald-affection-longue-duree/definition-ald> [Accessed 06 Oct 2021].
- ameli.fr - Prévalence. Available: <https://www.ameli.fr/l-assurance-maladie/statistiques-et-publications/donnees-statistiques/affection-de-longue-duree-ald/prevalence/prevalence-des-ald-en-2019.php> [Accessed 14 May 2021].
- Les avis Du CESE, les maladies chroniques. Available: https://www.lecese.fr/sites/default/files/pdf/Avis/2019/2019_14_maladies_chroniques.pdf [Accessed 14 May 2021].
- rapport-charges-et-produits-2019-web.pdf. Available: <https://www.ameli.fr/sites/default/files/rapport-charges-et-produits-2019-web.pdf> [Accessed 01 Oct 2021].
- Cockerham WC, Hamby BW, Oates GR. The social determinants of chronic disease. *Am J Prev Med* 2017;52:S5–12.
- Boiche J, Fervers B, Freyssenet D. *Activité physique : Prévention et traitement des maladies chroniques*. Paris: Inserm : Éditions EDP Sciences, 2019. <https://www.hal.inserm.fr/inserm-02102457>
- rapport_snss_2019-2024_cs6_v5.pdf. Available: https://www.sports.gouv.fr/IMG/pdf/rapport_snss_2019-2024_cs6_v5.pdf [Accessed 28 Oct 2021].
- Durstine JL, Gordon B, Wang Z, et al. Chronic disease and the link to physical activity. *J Sport Health Sci* 2013;2:3–11.
- World Health Organisation. WHO guidelines on physical activity and sedentary behaviour. Available: <https://www.who.int/publications/i/item/9789240015128> [Accessed Nov 2020].
- Charles. Available: - L’ACTIVITÉ PHYSIQUE SUR PRESCRIPTION EN FRANCE É.pdf
- Certification de programmes passerelles dans le dispositif “Prescri’Forme”, 2019. Available: <http://www.iledelfrance.ars.sante.fr/certification-de-programmes-passerelles-dans-le-dispositif-prescriforme-2019> [Accessed 06 Oct 2021].
- Bock C, Jarczok MN, Litaker D. Community-based efforts to promote physical activity: a systematic review of interventions considering mode of delivery, study quality and population subgroups. *J Sci Med Sport* 2014;17:276–82.
- Williams NH, Hendry M, France B, et al. Effectiveness of exercise-referral schemes to promote physical activity in adults: systematic review. *Br J Gen Pract* 2007;57:979–86.
- Orron G, Kinmonth A-L, Sanderson S, et al. Effectiveness of physical activity promotion based in primary care: systematic review and meta-analysis of randomised controlled trials. *BMJ* 2012;344:e1389.
- Albert FA, Crowe MJ, Malau-Aduli AEO, et al. Functionality of physical activity referral schemes (pars): a systematic review. *Front Public Health* 2020;8:257.
- Knobé S. La prescription médicale d’activité physique et perspectives socio-écologiques. *Sante Publique* 2019;31:827–36.

- 17 Morgan F, Battersby A, Weightman AL, *et al.* Adherence to exercise referral schemes by participants - what do providers and commissioners need to know? A systematic review of barriers and facilitators. *BMC Public Health* 2016;16:227.
- 18 Creswell JW. *A Concise introduction to mixed methods research*. SAGE Publications, 2014.
- 19 Adrien D. *Etude sur la pérennité de l'activité physique au sein d'une association proposant une passerelle d'activité physique adaptée encadrée de 12 semaines « Le Défi-Forme Santé »*, 2019.
- 20 Craig CL, Marshall AL, Sjöström M, *et al.* International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35:1381–95.
- 21 Quidelines_for_interpreting_the_IPAQ.pdf. Available: https://www.physio-pedia.com/images/c/c7/Quidelines_for_interpreting_the_IPAQ.pdf [Accessed December 14, 2021].
- 22 Gandek B, Ware JE, Aaronson NK, *et al.* Cross-validation of item selection and scoring for the SF-12 health survey in nine countries: results from the IQOLA project. International quality of life assessment. *J Clin Epidemiol* 1998;51:1171–8.
- 23 Van Hoye A, Johnson S, Geidne S, *et al.* Relationship between coaches' health promotion activities, sports experience and health among adults. *Health Educ J* 2020;79:763–74.
- 24 Creswel JW. Controverseries in mixed methods research. In: *The SAGE Handbook of qualitative research*. SAGE, 2011: 269–84.
- 25 N° D. *Décret n° 2016-1990 du 30 décembre 2016 relatif aux conditions de dispensation de l'activité physique adaptée prescrite par le médecin traitant des patients atteints d'une affection de longue durée*, 2016.
- 26 Varas AB, Córdoba S, Rodríguez-Andonaegui I, *et al.* Effectiveness of a community-based exercise training programme to increase physical activity level in patients with chronic obstructive pulmonary disease: a randomized controlled trial. *Physiother Res Int* 2018;23:e1740.
- 27 Arija V, Villalobos F, Pedret R, *et al.* Effectiveness of a physical activity program on cardiovascular disease risk in adult primary health-care users: the "Pas-a-Pas" community intervention trial. *BMC Public Health* 2017;17:576.