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Characteristics of patients receiving a prescription for adapted physical activity in Aubervilliers: a retrospective study

BACKGROUND

Physical activity is defined as any bodily movement produced by skeletal muscles that results in energy expenditure greater than that at rest[1]. It can prevent or cure certain diseases. This concept dates back to Antiquity[2]. The World Health Organization (WHO) recommends that adults engage in 150 to 300 minutes of moderate aerobic physical activity or 75 to 150 minutes of vigorous aerobic physical activity per week, combined with two sessions of muscle-strengthening activities[3]. The role of the attending physician is to encourage the patient to follow the WHO recommendations on physical activity[1]. The practice of physical activity, adapted if necessary, has shown numerous benefits in primary or secondary prevention, regardless of age and health status[1]. In certain pathologies, it is recommended to prescribe physical activity even before drug treatment[4]. Physical activity has been recognized to reduce cardiovascular mortality, the incidence of certain cancers, cognitive decline, and to increase survival rates[5–7]. Physical activity also improves mental health[8]. In 2022, the French National Authority for Health (Haute Autorité de Santé, HAS) recommended expanding the prescription of physical activity to the general population[1]. Adapted Physical Activity (APA) is a full-fledged therapy, either alone or in combination with drug treatments, for many chronic diseases, risk factors, and in people with reduced functional independance[1].

The prescription of APA has been effective since 2017, following the publication of a decree in 2016 specifying the conditions for dispensing APA (prescribed by the attending physician to patients with a long-term condition). Since 2023, the possibilities for prescribing APA have been extended to all physicians and to other pathologies[1]. As part of the patient's care pathway, APA can be prescribed by the general practitioner (GP), particularly the patient's attending physician[1]. The city of Aubervilliers is located in one of the most disadvantaged departments in France, with a high prevalence of cardiovascular risk factors and diseases[9]. With the aim of improving the health of its inhabitants and reducing social health inequalities, the city implemented a free APA program called "exercise on prescription" in 2015.

GPs from the municipal health center (CMS) are the main prescribers involved in this program. GPs can prescribe, following an initial consultation, an "exercise on prescription" with a referral to a sports educator for patients identified as eligible for inclusion in the program. A qualitative study conducted as part of this program in Aubervilliers described the motivations of patients at medium and high cardiovascular risk in 2016. The main motivational element for engaging in physical activity identified in the study was the desire for good mental, physical, and social health[10]. Due to its sustainable nature, this program, a pioneer in France since 2015, seemed conducive to studying adherence to an adapted physical activity program.

The main objective of the study was to describe the sociodemographic profile of patients benefiting from this program since its creation in 2015. The secondary objective was to compare the profile of patients who received an APA prescription under this program but never attended any session with those who attended multiple sessions.

METHOD

Study Type and Population

A retrospective observational study was conducted. The study population consisted of adult patients who consulted at the Aubervilliers CMS and who had received a prescription under the "exercise on prescription" program.

The city of Aubervilliers is in Seine-Saint-Denis (93), a department with an over-representation of cardiovascular diseases and social precarity[11]. The "exercise on prescription" program was created in 2015 at the Aubervilliers CMS in partnership with the municipality. It is free for beneficiaries. Initially, the GP identifies the indication, proposes it to the patient, and prescribes it. The prescribing physicians for APA could be GPs from the CMS and some private GPs in Aubervilliers who were partners in the program. The patient is then registered, and the contact details of the sports educator are provided to them.

The sports educator has validated training as a level 2 health-sport animator from the Île-de-France Regional Olympic and Sports Center. They offer an interview during which they assess the patient's functional abilities, then specify the modalities of the APA sessions, with the possibility of attending one or more weekly sessions, with multiple time slots during the week and several activities (yoga, muscle strengthening, aquagym). The number of sessions is not predetermined and depends on the participant.

Data Collection Methods

All patients who received an APA prescription from a GP practicing at the Aubervilliers CMS since the creation of the program were included in the study, regardless of whether they resided in Aubervilliers. In 2024, the Aubervilliers CMS had 6 full-time equivalent (FTE) GPs.

Data collection from consultations between January 2015 and January 2024 was carried out from November 2023 to March 2024. There is an activity register with the

list of patients included in the program. Anonymous data extraction from medical records was performed by the care team using a data extraction grid filled out on the secure software LimeSurvey©.

Variables studied

The main objective of our study was to describe the profile of patients (characteristics, sociodemographics, and comorbidities) benefiting from this program since its creation.

The first part of the data collection aimed to gather demographic and socioeconomic data: age, gender, marital status, number of children, socioprofessional categories, education level, health coverage, region of birth, resident of Aubervilliers (yes/no), resident of Seine-Saint-Denis (yes/no). The socioprofessional category was collected according to the 2020 nomenclature of professions and socioprofessional categories of the French National Institute of Statistics and Economic Studies (INSEE). It was recoded into 2 categories: active and inactive (retired and unemployed people). Health Coverage variable was used as a proxy for socioeconomic disadvantage and was dichotomized into two categories: standard health coverage, with or without supplementary health insurance, and means-tested or assistance-based coverage, comprising France's Complementary Health Insurance scheme (Complémentaire santé solidaire, CSS) and State Medical Aid (Aide médicale de l'État, AME).

The second part aimed to collect health data and identify any comorbidities. This part was constructed using the list of pathologies and health conditions that could be addressed by APA according to the HAS in 2022[1]. Cardiovascular risk was calculated using the SCORE2 cardiovascular risk score[1,2]. The last part concerned data related to the program: participation in zero, one, or multiple APA sessions as part of the program.

Socioeconomic and Demographic Variables	n (%)
Average age (years)	55.5 (SD 11.2)[1]
Gender	
Female	311 (71.3)
Male	125 (28.7)
Marital Status	
In a relationship	168 (38.5)
Single	206 (47.2)
Not available	62 (14.2)
Average number of children	2.1
Employment Status	
Active	183 (42.0)
Inactive	223 (51.1)
Not available	30 (6.9)
Education Level	
No diploma, CAP, BEP[2]	52 (11.9)
High school diploma	234 (53.7)
Higher education	120 (27.5)
Not available	30 (6.9)
Health Coverage	
Without income conditions	305 (70.0)
With income conditions	131 (30.0)
Region of Birth	
Europe	249 (57.1)
Other region	179 (41.1)
Not available	8 (1.8)
Residents of Aubervilliers	
Yes	350 (80.3)
No	86 (19.7)
Residents of Seine-Saint-Denis	
Yes	410 (94.0)
No	26 (6.0)

Table 1 - Socioeconomic and Demographic Characteristics of Patients Who Received a Prescription for Adapted Physical Activity from a General Practitioner at the Aubervilliers Municipal Health Center as Part of the "Exercise on Prescription" Program
[1] **SD**: Standard Deviation
[2] **CAP**: Certificat d'Aptitude Professionnelle (Vocational Training Certificate); **BEP**: Brevet d'Études Professionnelles (Vocational Studies Diploma)

Statistical analyses

For the descriptive analysis, qualitative variables were described using percentages and counts. Quantitative variables were described using means and standard deviations (assuming normality), otherwise using medians.

For the comparative analysis of patients who did not participate in any session with those who participated in multiple sessions, Student's t-tests (quantitative variables) and Chi² tests (qualitative variables) were performed. A multivariate analysis using logistic regression was used to study the association between socioeconomic factors and participation in the "exercise on prescription" program. The backward step-by-step method was used. The model with the lowest Akaike Information Criterion (AIC) was chosen. Adjusted odds ratios (aOR) and 95% confidence intervals (CI) were calculated for each of the variables studied. The significance threshold was set at 5%. Statistical analyses were performed using R® software, version 4.3.2.

Ethical and regulatory aspects

The opinion of the Data Protection Officer of Sorbonne Université was sought prior to the study to verify the compliance of the protocol with the General Data Protection Regulation (GDPR) and to request registration with the French Data Protection Authority (CNIL). No ethics committee was consulted because the study did not include vulnerable populations and did not address sensitive topics. This study complies with current French legislation (Public Health Code L1121-1, Law 2012-300 of March 5, 2012).

RESULTS

Sociodemographic characteristics

Since the implementation of the program, 436 patients had received an APA prescription from a GP at the CMS. The average number of monthly APA prescriptions was 0.7 per FTE GP. Of the 436 patients included, 306 (70.2%) had not attended any session, 15 (3.4%) had attended one session, and 115 (26.4%) had attended multiple sessions. The median number of participations in sessions among those adhering to the program was 12 (min 1; max 50).

The average age of participants was 55 years, ranging from 21 to 95 years (Table 1). The majority (71.3%) were women and were born in Europe (57.1%), North Africa (20%), and Sub-Saharan Africa (13%). Among the participants, 80.3% lived in Aubervilliers, and 13.7% lived elsewhere in Seine-Saint-Denis, totaling 94.0% of residents in the department. Approximately half of the sample was professionally inactive, unemployed (26.6%) or retired (24.5%). Among professionally active individuals, the majority held intermediate-level occupations (Table 1). All participants had health coverage. In total, 30.0% had assistance-based health coverage: 26.1% with CSS and 3.9% with AME. Participants had an education level equivalent to a high school diploma (53.7%), higher than a high school diploma (27.5%), or lower than a high school diploma (11.9%).

Biomedical characteristics

56.4% of patients had a declared attending physician at the CMS, while the rest of the sample was followed by a GP at the CMS without declaring them as their attending physician (Table 2). Furthermore, 89.0% had a registered long-term condition declaration entitling them to full coverage of health care costs related to that condition under the French statutory health insurance system. Participants had at least one cardiovascular risk factor for 94.7% of them, and 66.1% of participants were in a situation of obesity (BMI ≥ 30). Dyslipidemia was present in 28.0% of participants, and 48.2% had diabetes. About a quarter of the individuals were smokers (23.6%). A first-degree family history of cardiovascular disease was reported for 40.1% of participants. The calculated cardiovascular risk score (SCORE2) was less than 5% for 17.9% of participants, 5-10% for 47.2% of participants, and greater than 10% for 28.9% of participants. A personal history of cardiovascular disease was reported for 11.9% of participants. More than one third of participants (37.8%) had osteoarthritis. Regarding the mental health of the included individuals: 33.0% had a history of depression, 3.0% had a history of schizophrenia, and 12.2% had a known addiction (excluding tobacco).

Factors of participation in APA sessions

Among the variables examined (Table 3), only gender differed significantly between participants and non-participants (p=0.03), with women more likely to participate than men. In multivariate analysis, female gender remained significantly associated with participation (aOR = 1.80; 95% CI = 1.06–3.15; p = 0.03). No other variables were significantly associated with participation.(Table 4)

Biomedical Variables	n (%)
Declared attending physician at the Municipal Health Center	
Yes	246 (56.4)
No	190 (43.6)
Long-term condition (ALD)	
Yes	388 (89.0)
No	48 (11.0)
Cardiovascular risk factors	413 (94.7)
Average waist circumference (cm)	110 (SD = 18.8)[1]
Average BMI[2] (kg/m²)	32 (SD = 5.9)[1]
Obesity	288 (66.1)
Smoking	103 (23.6)
Dyslipidemia	122 (28.0)
Family history of cardiovascular disease	175 (40.1)
SCORE2	
< 5%	78 (17.9)
5–10%	206 (47.2)
> 10%	126 (28.9)
Not available	26 (6.0)
Associated pathologies	
Diabetes	210 (48.2)
Cardiovascular history	52 (11.9)
Asthma/COPD[2]	31 (7.1)
Cancer	28 (6.4)
Depression	144 (33.0)
Addiction (excluding tobacco)	53 (12.2)
Schizophrenic disorders	13 (3.0)
Osteoarthritis	165 (37.8)

Table 2 - Biomedical Characteristics of Patients Who Received a Prescription for Adapted Physical Activity
[1] **SD**: Standard Deviation
[2] **BMI**: Body Mass Index; **COPD**: Chronic Obstructive Pulmonary Disease

DISCUSSION

Main results

This study explored the sociodemographic and biomedical characteristics of a population that received an APA prescription as part of a free outpatient program deployed in an area marked by social precarity and a high prevalence of cardiovascular diseases. The participation rate in multiple APA sessions was 26.4%. The vast majority of people who participated in one session (88.5%) participated in multiple sessions.

Factors related to participation in the APA program

Female gender was associated with participation in APA as part of this program. Another study published in 2017 found, on the contrary, that female gender was associated with more dropouts from the APA program[13]. The majority of participants resided in Aubervilliers. The proximity of APA practice locations to the beneficiaries' homes could be an important advantage for regular physical activity practice in such a program.

The study thus highlighted a profile of people actively participating in the "exercise on prescription" program in Aubervilliers: mainly middle-aged women, close to the program, with health coverage without income conditions, a long-term condition, or presenting cardiovascular risk factors. A systematic review of the literature studied the barriers and facilitators to the implementation of APA[14]. Lack of time, financial cost, lower socioeconomic status, and access difficulties were factors limiting participation in APA.

The participation rate in the APA program was 26.4% of participants. Some international models of APA prescription, particularly the Swedish model, have shown that it increases physical activity and can serve as an example to improve our programs[15]. However, these models are part of a different context, where regular physical activity is more widespread than in France, although the target population of the studies was described as being predominantly inactive[16]. Lifestyle, particularly sedentary behaviour, is a barrier to participation in APA[14].

Specificities of patients receiving prescribed APA

The average BMI was 32 kg/m² among participants, with a majority of participants in a situation of obesity. GPs appeared to preferentially prescribe APA to patients with obesity. Another study looking at APA prescription in primary care found this result[13].

Some participants were of advanced age and/or had cardiovascular risk factors, suggesting that age or comorbidities were not identified as a contraindication to APA practice by prescribing GPs.

The majority of patients (89.0%) had a chronic pathology, explained by the fact that practitioners targeted patients with an ALD where physical activity has demonstrated benefits[1]. In the studied sample, the number of participants with a mental pathology, particularly depression, was high. In the literature, there is an association between depression and cardiovascular diseases, which can partly explain this result[17]. APA has demonstrated its effectiveness in this pathology despite the difficulty of participation in cases of depressive syndrome with a loss of motivation[14,18].

Compared Characteristics	Non-Participants (N = 306) n (%)	Participants (N = 115) n (%)	p
Average age (years)	M = 55.1[1]	M = 56.4[1]	0.25
Gender			0.03***
Female	207 (67.9)	91 (79.1)	
Male	98 (32.1)	24 (20.9)	
Marital Status			0.69
In a relationship	119 (43.6)	43 (46.7)	
Single	154 (56.4)	49 (53.3)	
Employment Status			0.44
Active	135 (46.2)	42 (41.2)	
Inactive	157 (53.8)	60 (58.8)	
Education Level			0.4
No diploma, CAP, BEP[2]	40 (13.6)	9 (9.0)	
High school diploma	167 (56.8)	63 (63.0)	
Higher education	87 (29.6)	28 (28.0)	
Health Coverage			0.93
Without income conditions	213 (69.6)	81 (70.4)	
With income conditions	93 (30.4)	34 (29.6)	
Declared attending physician at the Municipal Health Center			0.1
Yes	181 (59.2)	57 (49.6)	
No	125 (40.8)	58 (50.4)	
Residents of Aubervilliers			0.25
Yes	241 (78.8)	97 (84.3)	
No	65 (21.2)	18 (15.7)	
Long-term condition (ALD)			0.79
Yes	276 (90.2)	102 (88.7)	
No	30 (9.8)	13 (11.3)	
Cardiovascular risk factors			0.9
Yes	290 (94.8)	110 (95.7)	
No	16 (5.2)	5 (4.3)	
SCORE2			0.63
< 5%	155 (59.4)	48 (53.9)	
5–10%	88 (33.7)	35 (39.3)	
> 10%	18 (6.9)	6 (6.7)	
Cardiovascular history			0.29
Yes	40 (13.1)	10 (8.7)	
No	266 (86.9)	105 (91.3)	
Depression			0.65
Yes	100 (32.7)	41 (35.7)	
No	206 (67.3)	74 (64.3)	

Table 3. Compared Characteristics of Non-Participants and Participants
[1] **M**: Mean
[2] **CAP**: Certificat d'Aptitude Professionnelle (Vocational Training Certificate); **BEP**: Brevet d'Études Professionnelles (Vocational Studies Diploma)
***: Statistically significant (p < 0.05)

Socioeconomic and Demographic Characteristics	aOR	95% CI	p
Age	1.01	0.99–1.04	0.29
Female gender	1.8	1.06–3.15	0.03***
Education Level			
High school diploma vs. Higher education	1.13	0.66–1.97	0.66
Less than high school diploma vs. Higher education	0.69	0.27–1.62	0.4
Health coverage without income conditions	0.95	0.55–1.65	0.85
Professionally inactive	1.15	0.67–1.98	0.61

Table 4. Association between participation in the "exercise on prescription" program and socioeconomic and demographic characteristics, in multivariate analysis

Certain age groups (active young individuals under 40) seemed, on the other hand, underrepresented. Half of the people who received a prescription were professionally inactive (retired or unemployed), as it was probably necessary to have free time to participate in the sessions scheduled during the week. However, this employment status was not associated with participation in the program in our study. Precarious jobs with staggered hours are common in the population of Aubervilliers, which could help explain this result[11].

Strengths and weaknesses of the study

The study focused on an innovative and sustainable APA program in primary care, accessible to a population living in a deprived area. This study included all individuals who received a prescription for exercise on prescription from a GP at the CMS since its creation in 2015, allowing for a large number of participants (n=436). The study took into account multiple socioeconomic, demographic, and biomedical factors. The vast majority of medical records of the participants included in the study contained the patients' social situation, with few missing data.

The study was retrospective, based on medical records, which induced the presence of missing data. This could also induce non-differential classification bias during data extraction. However, this method made it possible to avoid recall bias and reduce the duration of data collection. Data extraction was carried out by the care team, familiar with the professional software. Referrals to the "exercise on prescription" program made outside the CMS framework could not be studied, which may have induced a selection bias, but they represented only a small proportion of participants (< 1%). APA was available only by medical prescription, and populations distant from care, particularly those not consulting a GP, could not be included in the program. Despite a large number of participants, the average number of prescriptions per FTE GP was lower than another study conducted in France in 2023[19]. However, it should be noted that our study includes the period of the COVID-19 pandemic, during which prescription activity was heavily impacted, before gradually recovering. This type of study did not allow questioning participants on the factors of motivation to enter the program or not. Finally, a multivariate analysis was performed to account for potential confounding, although residual confounding cannot be excluded.

Perspectives

Social health inequalities (SHI) affect the entire population in the form of a continuum called the "social gradi-

ent"[20]. In consultation, the GP must take into account the social determinants of health, thus enabling a bio-psycho-social approach[21]. Collecting this information helps anticipate potential barriers to optimal medical care follow-up[22]. The promotion of physical activity is part of the GP's role[23]. Engaging in leisure or sports physical activity can generate registration fees for members (sports license, gym membership, transportation costs to get to the activity location, etc.), limiting access for certain individuals with low income levels[24]. This local APA program, deployed in a socioeconomically disadvantaged population, provides free access to a non-drug therapy with proven effectiveness on many chronic pathologies[1]. The prescription of APA as part of this program is part of a social prescription approach beyond the initial medical prescription, as it directs the patient to a non-medical resource that can act on the social determinants of health[25]. A personalized and multidisciplinary approach in primary care enables the success of an APA program[26]. Finally, these results open important perspectives for future studies, particularly on the levers to optimize the prescription and adherence to APA in general medicine[27].

Summary

Introduction. General practitioners (GPs) have been allowed to prescribe adapted physical activity (APA) in France since 2017. In 2015, the city of Aubervilliers, in partnership with local GPs, implemented a free "exercise on prescription" program to promote physical activity.

Objective. To describe the sociodemographic characteristics of patients enrolled in this program.

Methods. We conducted a retrospective observational study including patients who received a free APA prescription through the Aubervilliers "exercise on prescription" program between 2015 and 2024. Sociodemographic characteristics and comorbidities were extracted from medical records. Multivariable logistic regression was performed to identify factors associated with active participation in the program.

Results. Among the 436 patients included, 306 (70.2%) did not attend any session, 15 (3.4%) attended only one session, and 115 (26.4%) attended multiple sessions. Among participants, the median number of sessions attended was 12 (range, 1–50). The mean age was 55 ± 11.2 years. Most patients were women (71.3%), were born in Europe (57.1%), and lived in Aubervilliers (80.3%). Approximately half were unemployed (26.6%) or retired (24.5%). Overall, 30.0% were covered by France's means-tested health insurance scheme, 89.0% had a long-term condition status. The mean body mass index was 32 ± 5.9 kg/m², with 66.1% of patients in a situation of obesity. In multivariable analysis, sex was the only factor associated with participation: women were more likely than men to attend multiple sessions (adjusted OR = 1.80; 95CI=1.06-3.15; p=0.03).

Discussion. Participants in the program were predominantly middle-aged women with long-term conditions and cardiovascular risk factors. Most patients who initiated the program continued attending sessions. GPs play a central role in promoting adapted physical activity.

Keywords: Exercise therapy - General practice - Chronic disease - Patient participation - Retrospective studies

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