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Implementing a prenatal health screening intervention for future fathers in Montreuil, France: most users are immigrants facing hardship

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Abstract

Background Prenatal care provides pregnant women with repeated opportunities for prevention, screening and diagnosis that have no current extension to future fathers. It also contributes to women's general better access to health. The goal of PARTAGE study was to evaluate the level and determinants of adherence to a prenatal prevention consultation dedicated to men.

Methods Between January 2021 and April 2022, we conducted a monocentric interventional study in Montreuil hospital. We assessed the acceptance of a prenatal prevention consultation newly offered to every future father, through their pregnant partner's prior consent to provide their contact details.

Results Three thousand thirty-eight women provided contact information used to reach the fathers; effective contact was established with 2,516 men, of whom 1,333 (53%) came for prenatal prevention consultation. Immigrant men were more likely to come than French-born men (56% versus 49%, $p < 0.001$), and the more they faced social hardship, the more likely they were to accept the offer. In multivariate analysis, men born in Sub-Saharan Africa and Asia were twice as likely to attend the consultation as those born in Europe or North America.

Conclusion Acceptance of this new offer was high. Moreover, this consultation was perceived by vulnerable immigrant men as an opportunity to integrate a healthcare system they would have otherwise remained deprived of.

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Keywords Social inequalities in health, Migrants health, Prenatal health, Gender inequalities, HIV, Sexually transmitted infections, Vaccination, Health insurance coverage

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Introduction

Gynecological care: an opportunity for prevention, screening and health improvement

Worldwide, men have less contact with the healthcare system [1] and seek primary care less often than women [2–4]. One reason is that gynecological care (contraception, pregnancy, cervical cancer prevention) makes women used to meeting healthcare professionals regularly, even in absence of any disease [5].

Most countries recommend regular medical check-ups and biological monitoring during pregnancy. When the father's health is taken into the picture, this is to avoid genetic or infectious transmission rather than keeping the father himself in good health [6]. Even then, infectious diseases are poorly screened in the second parent: HIV diagnosis is delayed in heterosexual men compared to women, because male partner uptake of HIV testing during antenatal care remains scarce [7], despite numerous initiatives to promote it [8–12].

Prenatal visits are also used to encourage behavioral changes in pregnant women, such as smoking and alcoholic withdrawal, promoting physical exercise and combating obesity [13, 14]. To date, men do not have such opportunities. Yet, involving their partner supports behavioral changes in pregnant women [15]. In addition, important health needs were identified in a cohort of future fathers [16] and fatherhood is a high-risk period for depression in men [17, 18].

Expecting a child could therefore be an opportunity to offer men a consultation designed to protect the mother and the foetus from transmissible diseases, but also to improve or preserve their own health [19].

The French context and the Seine Saint Denis specific situation

In France, seven medical visits are scheduled during pregnancy. The prenatal HIV screening strategy is highly effective in women, with at least 97% of them tested at every pregnancy [20]. Systematic HIV screening is also recommended for fathers [21], yet not performed: between 2017 and 2020, among 567 fathers surveyed, only 3% knew a man who had been tested for HIV in connection with his partner's pregnancy [22].

The French health insurance scheme mentions the possibility of a medical examination for the father. However, there are no guidelines for reimbursing this consultation or the biological tests that would be prescribed during it: paternal prenatal consultation is therefore not currently practiced.

Seine Saint-Denis (population; 1.6 million inhabitants), located in the northeastern suburbs of Paris (Ile de France region), is the department with the highest

rates of immigration and poverty in mainland France [23]. As elsewhere in Europe, most immigrants arrive in better health than the general population ("healthy immigrant effect"), before their health deteriorates faster and more than the natives' one throughout their stay ("unhealthy convergent effect") [24]. Although access to healthcare is theoretically universal in France, with a system called Aide Médicale de l'Etat (State Medical Aid) allowing illegal immigrants with proof of a continuous presence of at least three months in the country to access the healthcare system, nearly half of illegal migrants don't get this health coverage due to lack of adequate information, with a lower rate of take-up among men [25]. Immigrants are also disproportionately affected by social vulnerability, especially in the years following their arrival: the median time to obtain a basic security package (residence permit, housing, income-generating activity) for immigrants from sub-Saharan Africa was estimated to 7 years in Paris area [26]. Lack of housing or residence permit is associated to deteriorated health, and to exposition to sexual risks and infections [27]. Recent French recommendations on vaccination catch up [28] and on health check-up [29] for newly arrived immigrants should be fully implemented in our setting, which raises the question of how to reach those populations effectively.

Montreuil (111 000 inhabitants) hospital maternity ward provides prenatal care for some 3,500 women every year. In 2020–2021, 4.6% of women who gave birth in Montreuil were immigrants with < 12 months' residence in France [30]. Among all women who delivered in Montreuil hospital over the same period, 52% were later identified as socially vulnerable, 41% of them being born in Sub-Saharan Africa and 11% in Asia [31].

In this maternity where poverty and immigration prevail, a Personalized Pregnancy Follow Up Unit has been implemented so that the most vulnerable pregnant women receive early reinforced multidisciplinary care [31]. However, their partners, and adult men in general, hardly ever get targetted by interventions aimed at reducing social inequalities in health. We seized the symbolic opportunity of parenthood to offer future fathers a free prenatal consultation. PARTAGE was an interventional study: intervention consisted in a prenatal consultation dedicated to the male partners of all women attending antenatal care in our clinic. Acceptability of this intervention was assessed, with the final aim of transferring it to routine practice. The primary endpoint of PARTAGE study was the proportion of men contacted who actually attended the prenatal consultation offered to them. The results presented in this article focus on this main objective: the acceptance rate and the socio-demographic factors associated with this acceptance.

Methods

PARTAGE (« Prévention, Accès aux droits, Rattrapage vaccinal, Traitement des Affections pendant la Grossesse et pour l'Enfant») was a monocentric interventional research without control arm assessing for 15 months (January 2021–April 2022) the acceptability of a new prenatal prevention consultation offered through the pregnant women to all future fathers in Montreuil's hospital.

Study population

Eligible women were 18 and older pregnant women attending a first prenatal consultation at Montreuil hospital during the study period, reporting a male partner positively involved in the pregnancy.

Eligible men were those designated by the participating woman as the father, provided they lived in Ile-de-France region. To make it simple, « men», « partners» or « fathers» all refer to them.

Intervention

The interview was integrated into the women's maternity trajectory. Trained interviewers offered eligible women to respond to a face-to-face questionnaire that included their sociodemographic and marital characteristics (maternal questionnaire, MQ, Additional file 1). Women were asked to provide the future father's contact details. When the father was present, the project was presented directly to the couple and the consultation appointment could be made immediately. Several time slots were open for unscheduled consultations: if the couple met the interviewers during those slots, the father could choose to attend the prenatal consultation straight away.

An information letter was given to all eligible pregnant women. An e-mail was sent to men for whom an e-mail address was provided, with an online appointment platform link and dedicated phone-line and e-mail address to schedule consultation. Fathers who did not reply were called by a research midwife and offered an appointment either during the day or in the evening, on weekdays or Saturday, at the hospital or in the city center, within easy reach of public transportation.

Fathers received a text reminder before appointment. If they failed to attend, they were systematically called again and given the option of either refusing the consultation (their reason for refusal was then collected and they were not called again) or rescheduling and being called again in case of another missed appointment.

Fathers were seen by a doctor or midwife. Blood pressure was measured, clinical examination was carried out if needed, biological tests were adapted to individual's exposure and medical history. Vaccines were updated; fathers lacking health insurance coverage met a social worker to obtain it. Test results were delivered face

to face, by telephone or by e-mail, according to men's choice. Depending on their needs, men were referred to a health mediator, a psychologist, a general practitioner or any hospital specialist. The full protocol and details on the study are available [32, 33].

Ethics

The French Data Protection Authority (CNIL, registration number 921135) and the French Personal Data Protection Committee (Comite de Protection des Personnes, registration number 21.01.19.44753 amended by 21.05022.944753 decision, allowing and increased number of inclusions and additional data collection) gave full ethical approval.

Statistical analysis

Women's own sociodemographic characteristics, their partners' ones as well as data on the couple (length of relationship, previous children, type of union, communication about sexually transmitted infections and previous screening) were collected in maternal questionnaire. In addition to the general sociodemographic data; variables exclusively or particularly related to immigrant status were collected (main reason for women's migration, length of stay, permit of residence, housing conditions, health insurance coverage).

Data were compared between fathers who attended the prenatal prevention consultation and those who did not, using Chi [2] or Fisher exact tests for categorical variables and Student's or Wilcoxon rank sum tests for quantitative variables, as appropriate. All tests were two-sided with p -values < 0.05 defined as statistically significant. Multivariate logistic regression models were built to identify the factors associated with men's take-up of this offer, based on their own characteristics on one hand, and on their pregnant partner's as well as the couple's characteristics on the other hand, in the general study population, and then in the sub-groups of immigrant men and women. Backward elimination procedures were used to determine the final models. Given the limited number of missing data, no imputation was performed, in order to avoid introducing bias. Incomplete observations were removed from the multivariate models. Analyses were performed in Stata SE 17 (Stata Corporation, College Station, TX, USA).

Results

Acceptance rate and characteristics of the studied population

Among 4205 women with first hospital prenatal visit during the study period, 3808 were eligible, 3038 provided effective contact details which enabled the research team to contact their partner. Contact was actually made

(face-to-face, by phone or via message exchange) with 2516 men (83%), of whom 1333 (53%) eventually attended father's prenatal prevention consultation (FPPC) (Fig. 1).

Regarding women: their median age was 31 years, interquartile range 28–35 years. One third was expecting a first child; 49% had a university degree, whereas 46% were unemployed prior to current pregnancy; 13% believed they had never been tested for HIV, while 15% identified their ongoing pregnancy serology as their first. Only 36% recalled a couple's discussion about HIV or sexually transmitted infections (STIs), and 56% didn't know if their partner had ever been tested for HIV. 78% predicted that the future father would attend the prenatal consultation he would be offered.

Fifty-two percent were immigrants, most often from Subsaharan Africa (20%), North Africa or the Middle East (18%). Among the immigrant women ($N=1590$): 51% had been in France for less than 7 years, the median time to achieve a basic level of installation [26]; 9% had no residence permit and 9% no health insurance coverage. Two-thirds had come to France to join either their husbands (43%) or a family member (26%), while 17% had come to seek a better life, 8% to study, 6% to escape threats or violence, and only 0.7% for health reasons.

Regarding men: Their median age was 35 (IQR30–40 years); 35% had been to university, 14% were unemployed. Fifty-nine percent of those with whom contact had been established were immigrants ($N=1490$): 25% came from Subsaharan Africa, 19% from North Africa or the Middle East. Only 29% had been in France for less than 7 years, 18% had no residence permit, and 11% had no health insurance coverage. Only 11% have themselves taken the step of making an appointment, while 78% responded to requests from the research team, generally (57%) midwives' phone calls. The use of unscheduled consultations remained marginal (1.6%) (Table 1).

Characteristics of women whose partner accepted the offer

Comparison of women whose partner came to the consultation with women whose partner did not

Partners of primipara were more likely to come than those of women who were already mothers, especially if the couple already had children together (53% versus 38%, $p < 0.001$).

Partners of women born in Subsaharan Africa, Asia and Latin America-Haiti took up the offer better than those born in France (56%, 62% and 50%, respectively, versus 38%, $p < 0.001$).

Partners of women in precarious situations (homeless, with SMA or no health insurance coverage) came more often than those of women living in their own homes or registered with the general health insurance scheme.

Partners of women declaring a first HIV serology during the current pregnancy were more likely to take up the offer than those of women who were unaware of having been tested, and those who had been tested prior to the current pregnancy (50% versus 46% and 42%, respectively, $p = 0.004$).

Half of men whose partner predicted they would take up the offer actually came, versus 22% of those whose partner were uncertain, and 13% of those whose partner predicted that refusal ($p < 0.001$, Table 2).

Women's characteristics associated with their partners' attendance

After adjusting for other women's characteristics, those born in Subsaharan Africa (OR 2.23 [1.79–2.78]), Asia (OR 3.14 [2.15–4.59]) or Latin America-Haiti (OR 1.71 [1.04–2.82]) were more likely to have their partner attending than those born in France. Women's level of education remained associated with their partners' attendance: partners of women with a low level of formal education (no or only elementary school) or, on the contrary, a high level of formal education (university degree) came more often than those of women with a high school level (Fig. 2, graph a).

Characteristics of the immigrant women sub-population associated with their partner's attendance

In multivariate analysis, partners of women born Subsaharan Africa and Asia made greater use of this new consultation than those of women from Europe, USA or Australia, even after adjustment for length of stay, reason for migration, housing, administrative status and parenthood (OR 1.61 [1.16–2.23] and OR 2.35 [1.50–3.68], respectively). Homelessness, migration for their own safety or to seek a better life, and a residence period of less than seven years were independently associated with the partner's attendance (Fig. 2, graph c).

Characteristics of men who took up the offer

Comparison of men who came to the consultation versus those who did not

Participation was higher among men aged 30 and over than among younger ones, and among Subsaharan African, Asian and Latin American-Haitian immigrants than among French-born men (49% versus 61%, 63% and 53% respectively). Immigrants present for less than 7 years came more often than those who had been in France for longer (66% versus 55%, $p < 0.001$). As for women, men with social vulnerabilities (no residence permit, no affiliation to the general health insurance scheme) made greater use of consultations than less precarious ones. The uptake rate was lower among men with a secondary level of education than among men with a lower or higher

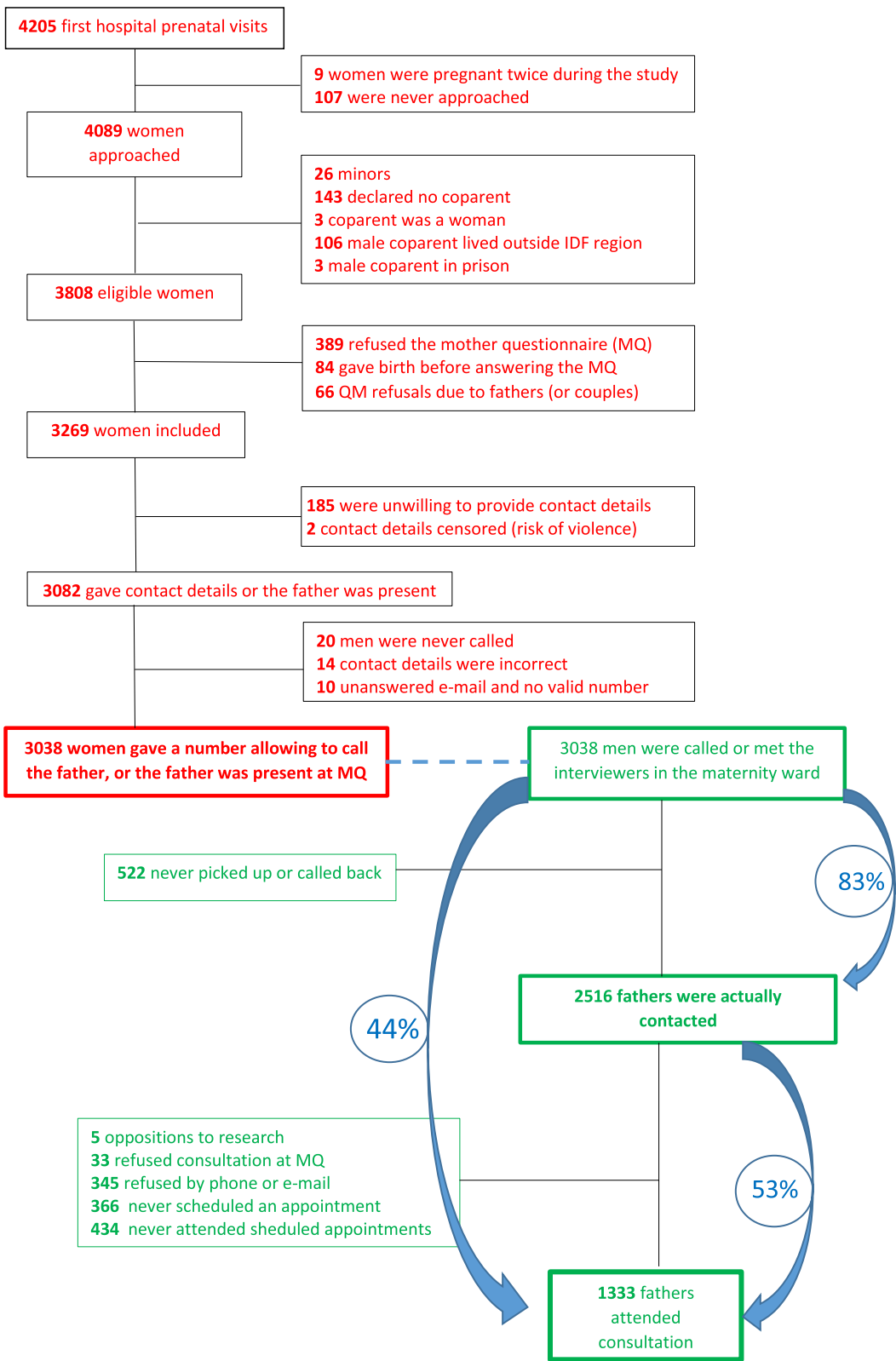


Fig. 1 Study flow chart, Montreuil (France) 2021–2022

Table 1 Characteristics of the study population, Montreuil (France) 2021-2022

	Women who gave effective contact information		Men who were actually contacted	
	N	% or [IQR]	N	% or [IQR]
Sociodemographic characteristics				
Population size	3038	100%	2516	100%
Of which foreign-born	1590	52.3%	1490	59.2%
Age (years)	31	[28-35]	35	[30-40]
[18-24]	345	11.3%	116	4.6%
[25-29]	897	29.5%	391	15.5%
[30-34]	1029	33.9%	744	29.6%
[35-39]	604	19.9%	609	24.2%
40 and over	163	5.4%	656	26.1%
Region of birth				
Mainland France	1401	46.1%	986	39.2%
French overseas departments and territories	47	1.5%	40	1.6%
European Union and United Kingdom (EU-UK)	126	4.1%	95	3.8%
Subsaharan Africa	603	19.9%	633	25.1%
Asia	143	4.7%	152	6.0%
North Africa and Middle East	555	18.3%	480	19.1%
Latin America and the Caribbean	70	2.3%	60	2.4%
Non EU-UK Europe, North America, Australia	93	3.1%	70	2.8%
Length of residence in France (for foreign-born) ^a				
< 7 years	818	51.5%	413	28.7%
>= 7 years	769	48.5%	1024	71.3%
Main reason for coming to France (in foreign-born) ^{b,c}				
Find a job, seek a better life	263	16.6%		
Join her husband	678	42.8%		
Join another member of the family	412	26.0%		
Study	129	8.1%		
Threatened in her country	92	5.8%		
Disease	11	0.7%		
Education level ^d				
None/Primary or koranic school	272	9.0%	283	11.6%
Secondary	1274	42.0%	1301	53.1%
University	1483	49.0%	864	35.3%
Living conditions				
Administrative status ^e				
French nationality	1713	56.4%	1350	53.7%
Regular EU status	182	6.0%	158	6.3%
10 years residence card	420	13.8%	439	17.5%
>= 1 year residence permit	314	10.3%	256	10.2%
< 1 year residence permit or receipt	103	3.4%	40	1.6%
No residence permit	306	10.1%	270	10.7%
Health insurance coverage ^f				
No	145	4.8%	161	6.5%
State Medical Assistance (SMA)	200	6.6%	124	5.0%
Basic Health Insurance	262	8.6%	278	11.1%
Complete Health Insurance	2431	80.0%	1933	77.4%
Housing conditions ^g				
Personal housing (owner or tenant, including social lease)	2573	84.8%		
Hosted by family	324	10.7%		
Hosted by associations	19	0.6%		
Hosted in residence for asylum seekers or migrant hostel	25	0.8%		
No housing or overnight stay in social hostel	95	3.1%		
Employment status (excluding the pregnancy period for women) ^h				
Non-precarious employment	1376	45.3%	1664	66.9%

Table 1 (continued)

	Women who gave effective contact information		Men who were actually contacted	
	N	% or [IQR]	N	% or [IQR]
Precarious employment	147	4.8%	433	17.4%
Education or training	90	3.0%	30	1.2%
Parental leave	39	1.3%	0	0%
Unemployment	1385	45.6%	360	14.5%
Couple's characteristics				
Marital statusⁱ				
No formal union	842	27.8%		
Civil, religious or traditional formal union	2190	72.2%		
Cohabitation^j				
No or not really	271	8.9%		
Yes	2763	91.1%		
Couple duration^k				
Not really together	27	0.9%		
< 1 year	120	4.0%		
1-3 years	622	20.6%		
4-10 years	1445	48.0%		
Over 10 years	799	26.5%		
Children already born				
Woman's first child	1016	33.4%		
The woman has children but only with other father(s)	190	6.3%		
The couple already have children	1832	60.3%		
Couple discussion about HIV and STIs^l				
Never, or the mother doesn't remember	1933	64.2%		
Yes	1076	35.8%		
Woman's knowledge of having been screened for HIV^m				
Never screened or doesn't know	397	13.2%		
Screened before current pregnancy	2167	71.8%		
First screening during this pregnancy	452	15.0%		
Woman's knowledge of father's possible HIV testⁿ				
Never screened or doesn't know	1686	55.9%		
Already screened	1330	44.1%		
Woman's prognosis of father's attendance^o				
Thinks he won't attend FPCC	166	5.5%		
Doesn't know if he will	490	16.2%		
Thinks he will attend	2376	78.4%		

Data are n (%) or median [interquartile range]

^a Data missing for 3 women and 53 men

^b Data only collected for women

^c Data missing for 5 women

^d Data missing for 9 women and 68 men

^e Data missing for 3 men

^f Data missing for 20 men

^g Data missing for 2 women

^h Data missing for 1 woman and 29 men

ⁱ Data missing for 6 couples

^j Data missing for 4 couples

^k Data missing for 25 couples

^l Data missing for 29 couples

^m 22 women did not respond

ⁿ 22 women did not respond

^o 6 women did not respond

Table 2 Women's characteristics by partner's attendance to father prenatal prevention consultation, Montreuil (France) 2021-2022 (N = 3038 partners called or met)

	Women whose partner came (N = 1333)		Women whose partner did not come (N = 1705)		P-value
	n	%	n	%	
Age^a					
[18-24 years]	153	44.3%	192	55.7%	0.531
[25-29 years]	376	41.9%	521	58.1%	
[30-34 years]	456	44.3%	573	55.7%	
35 and over	348	45.4 %	419	54.6%	
Region of birth					
France	557	38.5%	891	61.5%	<0.001
UE 27-UK	54	42.9%	72	57.1%	
Europe non-EU 27-UK, North America, Australia	39	41.9%	54	58.1%	
North Africa and Middle East	221	39.8%	334	60.2%	
Subsaharan Africa	338	56.0%	265	44.0%	
Asia	89	62.2%	54	37.8%	
Latin America and the Caribbean	35	50.0%	35	50.0%	
Length of residence in France^b					
< 7 years	443	54.2%	374	45.8%	<0.001
>= 7 years	331	43.1%	437	56.9%	
Born in France	557	38.5%	891	61.5%	
Main reason for migration					
Not applicable (born in France)	557	38.5%	890	61.5%	<0.001
Find a job, seek a better life	150	57.0%	113	43.0%	
Join someone (family, husband) or study	553	45.3%	667	54.7%	
Disease or threatened in her country	71	68.9%	32	31.1%	
Education level					
None/ Primary or koranic school	153	56.2%	119	43.8%	<0.001
Secondary	497	39.0%	777	61.0%	
University	679	45.8%	804	54.2%	
Administrative status					
French nationality	674	39.3%	1039	60.7%	<0.001
Regular EU status	83	45.6%	99	54.4%	
10-year residence card	185	44.0%	235	56.0%	
Residence permit 1 year or more	156	49.7%	158	30.3%	
< 1 year residence permit or receipt	52	50.5%	51	49.5%	
No residence permit	183	59.8%	123	40.2%	
Health insurance coverage					
No	79	54.5%	66	45.5%	<0.001
State Medical Assistance	116	58.0%	84	42.0%	
Basic Health Insurance only	96	36.6%	166	63.4%	
Complete Health Insurance	1042	42.9%	1389	57.1%	
Employment status (excluding the pregnancy period)					
Precarious employment, student, in training	123	51.2%	117	48.8%	0.056
Non-precarious employment	598	43.5%	778	56.5%	
Unemployment or on parental leave	612	43.1%	809	56.9%	
Housing conditions					
Personal housing	1090	42.4%	1483	57.6%	<0.001
Hosted (family, association)	173	47.0%	195	53.0%	
No housing or overnight stay in social hostel	70	73.7%	25	26.3%	

Table 2 (continued)

	Women whose partner came (N = 1333)		Women whose partner did not come (N = 1705)		P-value
	n	%	n	%	
Couple duration					
Not really together	10	37.0%	17	63.0%	<0.001
< 1 year	67	55.8%	53	44.2%	
1-3 years	306	49.2%	316	50.8%	
4-10 years	638	44.1%	807	55.9%	
Over 10 years	312	39.0%	487	91.0%	
Children already born					
No	536	52.8%	480	47.2%	<0.001
Yes, including children with the same father	703	38.4%	1129	61.6%	
Yes, but only with other father(s)	94	49.5%	96	50.5%	
Have you had an HIV test?					
No or I don't think so	182	45.8%	215	54.2%	0.004
Yes, even before the current pregnancy	914	42.2%	1253	57.8%	
Yes, only during this pregnancy	228	50.4%	224	49.6%	
Have you ever talked about HIV/STIs with your partner?					
No or I don't know	858	44.4%	1075	55.6%	0.472
Yes	463	43.0%	613	57.0%	
Do you think he will accept FPPC?					
No	22	13.2%	144	86.8%	<0.001
I don't know	108	22.0%	382	78.0%	
Yes	1200	50.5%	1176	49.5%	

^a Cohabitation with the father, marital status, women's knowledge of father's HIV status and of any HIV performed by the father were also analyzed, with no difference between groups. A complete comparison of women's characteristics is provided as additional file 2

^b When the sum of the category headcounts does not correspond to the total headcount, there are missing data (see Table 1)

level of education (49% versus 63% and 59%, respectively, $p < 0.001$), and a similar trend was observed with regard to women's level of education. Finally, the proportion of adherence was similar whether or not men had any medical follow-up (53% versus 47%, $p = 609$, Table 3).

Men's characteristics associated with their attendance

After adjustment for other men's characteristics, father attendance remained strongly associated with the couple's expecting a first child (odds Ratio [OR] 2.00 95% confidence interval [95% CI] 1.67–2.40, $p < 0.001$) and with the father's being born abroad (Subsaharan Africa OR 1.83 95% CI 1.45–2.31, Asia OR 1.82 95% IC 1.26–2.63, Fig. 2, graph a).

Men aged 30 and over remained more receptive to the offer than younger men. The same U-shaped curve was observed for educational level: men with little or no schooling and men with higher education were more likely to seek advice than men who had studied up to secondary school. In the overall study population, compliance was higher in men aged 30 and over than in younger ones (Fig. 2, graph b).

Immigrated men's characteristics associated with their attendance

In multivariate analysis, immigrants from Subsaharan Africa and Asia attended more than those from Europe or North America (OR 1.96 [1.33–2.88] and OR 2.06

(See figure on next page.)

Fig. 2 Women's and men's characteristics associated with men's acceptance of Father's Prenatal Prevention Consultation (FPPC), Montreuil (France), 2021–2022¹

¹Reference groups in graph a are: France for region of birth, secondary school for education level, couple with children for parity, non precarious job for employment; graph b: France for region of birth, secondary school for education level, <30 for age, any job for employment, couple with children for parity, >= 4 years for union's duration; graph c: Europe/North America/Australia for region of birth, secondary school for education level, >= 7 years for length of stay, study/join someone for main reason for coming to France, regular situation for administrative status, personal house for housing conditions, couple with children for parity; graph d: Europe/North America for region of birth, secondary school for education level, >= 7 years for length of stay, regular situation for administrative status, couple with children for parity. For logistic regressions, see Additional file 3

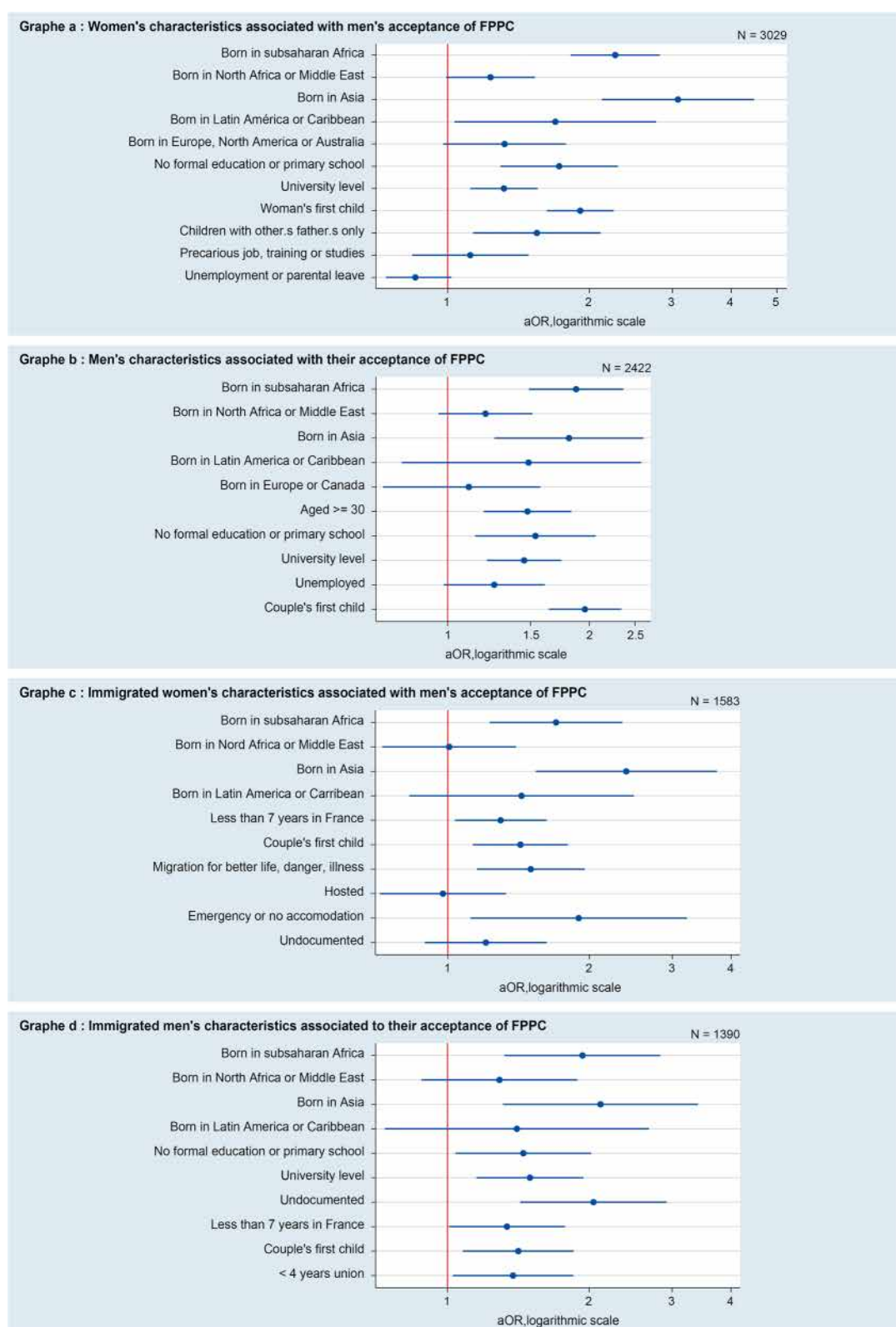


Fig. 2 (See legend on previous page.)

Table 3 Men's characteristics by attendance to father prenatal prevention consultation, Montreuil (France) 2021-2022 (N = 2516 men actually contacted)

	Men who attended (N = 1333)		Men who did not attend despite effective contact (N = 1183)		P-value
Age^a					
[18-29 years]	238	46.9%	269	53.1%	0.009
[30-34 years]	402	54.0%	342	46.0%	
35 and over	693	54.8%	571	45.2%	
Region of birth					
France	500	48.7%	526	51.3%	<0.001
EU 27	42	44.2%	53	55.6%	
Non-EU 27 Europe, Canada	32	45.7%	38	54.3%	
North Africa and Middle East	245	51.0%	235	49.0%	
Subsaharan Africa	386	61.0%	247	39.0%	
Asia	96	63.2%	56	36.8%	
Latin America and the Caribbean	32	53.3%	28	46.7%	
Length of residence in France					
< 7 years	274	66.3%	139	33.7%	<0.001
>= 7 years	559	54.6%	465	45.4%	
Born in France	500	48.7%	526	51.3%	
Administrative status					
French nationality	679	50.3%	671	49.7%	<0.001
Regular EU status	75	47.5%	83	52.5%	
10-year residence card	217	49.4%	222	50.6%	
>= 1 year residence permit	143	55.9%	113	44.1%	
Residence permit < 1 year or receipt	23	57.5%	17	42.5%	
No residence permit	196	72.6%	74	27.4%	
Health insurance coverage					
No	106	65.8%	55	34.2%	<0.001
State Medical Assistance (SMA)	88	71.0%	36	29.0%	
Basic Health Insurance	118	42.5%	160	57.5%	
Complete Health Insurance	1021	52.8%	912	47.2%	
Employment status					
Precarious employment, student, in training	247	53.4%	216	46.6%	0.052
Non-precarious employment	872	52.4%	792	47.6%	
Unemployment	214	59.4%	146	40.6%	
Level of education					
None, primary or koranic school	179	63.3%	104	36.7%	<0.001
Secondary	641	49.3%	660	50.7%	
University	512	59.3%	352	40.7%	
Other children with the same mother					
No	629	60.7%	407	39.3%	<0.001
Yes	704	47.6%	776	52.4%	
Integration into the healthcare system					
Rarely or never in contact with a physician	458	53.8%	394	46.2%	0.609
Has a primary care physician or chronic disease follow-up	875	52.7%	786	47.3%	

^a When the sum of the category headcounts does not correspond to the total headcount, there is missing data (see Table 1)

[1.28–3.34], respectively), while paternal age was no longer associated with the acceptance rate. Immigrant men involved in a recent relationship came more often than those in a longer relationship (Fig. 2, graph d).

After adjustment for other precariousness criteria including country of origin, healthcare coverage, length of stay and employment, undocumented fathers remained more likely to attend than fathers with residence permit (OR 2.41, 95% CI 1.80–3.22 in the complete multivariate model and OR 1.93, 95% CI 1.34–2.77 in the final model, additional file 3).

Discussion

Our main findings were a high level of acceptance by men, though lower than the women's predictions (78% thought their partner would come). Acceptance was higher among immigrants, especially the most precarious ones.

A high participation rate, based on a proactive approach

The participation rate was 44% based on the target population and 53% based on the men who actually had a contact with the research team. We did not find any similar published initiatives to compare our participation rates with. In 2011–2012, a British team offered HIV and Sexually Transmitted Infection (STI) testing to expectant fathers during obstetric ultrasounds examinations. The initiative led to an acceptance rate of 35%, but the coverage rate (18%) was limited by the study design, focusing the offer on the men attending ultrasounds with their partners [10]. While a letter given by PARTAGE interviewers to participating women, and a subsequent e-mail, instructed men on how to easily book their own appointments, the proactive approach of calling each eligible father one or more times or offering immediate appointment when they were present at the maternal questionnaire has been the main mode of recruitment for male consultation (78%). Earlier, proactive interventions also proved efficient in promoting HIV testing in future fathers, in different Sub-Saharan African settings: randomized controlled trials showed higher HIV test rates in future fathers when men received an invitation letter to attend the clinic [12], sometimes with an appointment already booked [34]. The highest recourse rates were obtained by caregivers' home visits for immediate couple counselling and testing [35].

In an other field, that of cancer in high-income countries, as screening had been showed to be lower in immigrated and socially disadvantaged populations [36, 37], proactive interventions have been built and assessed towards those publics: "Health navigators" call their targets on the phone, explain the screening, schedule

appointments, assess lack of transportation, financial and insurance barriers [38]. The effectiveness of such programs in increasing screening rates has been demonstrated [39].

Overall, the proactive approach has been positively received by PARTAGE targeted men, particularly by immigrants in precarious situations, who have largely taken up the offer. However, we have always sought consent from pregnant women before contacting their partners, in order not to disempower them [40].

Although the association did not remain significant after adjustment, the partners of women who reported a first HIV test during the current pregnancy were more likely to come than those of women who were unaware of having been tested, and than those of women who had been tested previously. This finding supports the promotion of couple-oriented screening. However, using the symbolic occasion of childbirth to incite fathers to care for their own health would probably not be sufficient without this active outreach, as long as the social norm on both parent's duties remains unchanged, with a gendered distribution of responsibilities that places women as guardians of children's health [41, 42].

Immigrants were the most receptive to the offer, especially those with social vulnerabilities

Immigrant men took up the offer better than French-born men, particularly those from Sub-Saharan Africa and Asia. This differential acceptance persisted after adjustment to men's social vulnerabilities. Therefore, the most precarious immigrants are the ones who came to the FPPC the most.

Yet the reduced flexibility of working hours for fathers in precarious employment has been identified as a potential obstacle to their attendance at classic antenatal visits [43], the availability issue was less frequently raised by socially vulnerable men than by well established ones (unshown data: reasons given by eligible fathers when refusing the offer). However, consultation schedules were deliberately extended to include evenings and weekends.

One possible explanation for immigrants' greater attendance is their need to be helped in opening up health insurance rights: 7% of men had no health insurance coverage when surveyed, although French system theoretically covers nearly everyone. Another explanation could be greater uncovered healthcare needs in immigrants [44].

Surprisingly, while lack of health insurance coverage was associated with the use of consultations, having a medical follow-up was not. Number of French-born men with no social vulnerability did not have any medical follow up and did not attend FPPC. We may hypothesize that the reason why well-integrated men do not take up

the offer is that they have the social skills to access the healthcare system, should a health problem occur. This hypothesis is supported by the finding of inequitable access to the healthcare system for immigrants in various European countries, including France [45].

Strengths and limitations

While most of the research published in the field has emphasised the importance of involving men in prenatal care in order to improve the health of the mother and the development of the child, this is, to our knowledge, the first structured healthcare intervention built in the perspective of improving fathers' own health.

This survey has several limitations: research team's outreach efforts towards the fathers, free and easy access to a multidisciplinary team, may not be replicable in routine clinical practice. Moreover, monocentric design limits the generalizability of the results. Given our context, marked by social insecurity and immigration, we reached men who may not have the same needs as the general population of fathers. We can, however, project that in areas where poverty prevails, the most disadvantaged men would seize a routine prenatal consultation as a point of entry into the health system.

Lastly, broader needs emerged during the study, including systematic mental health assessment. Another challenge is to address men with preventive messages on various topics regarding child and family health: risk of domestic violence, overexposure to screens, diet, substance abuse. The burden of transmitting and applying those recommendations currently devolves largely onto women and could therefore be better shared. A male prenatal consultation including these new components is currently being implemented and assessed throughout Montreuil municipality (PARTAGE 2 project).

Conclusion

Although a prenatal consultation with biological tests is theoretically possible in France, it is not yet implemented. This study has shown that such consultation is well accepted when, for the first time, it is actually organized and offered. The men who make most use of it are immigrants with social vulnerabilities, and those who have been in France for less time. This consultation therefore appears as an opportunity for men facing administrative obstacles, or who do not have the social codes of the country they live in, to integrate into the healthcare system. Scaling up this intervention might thus reduce social inequalities in health. Consideration now needs to be given on how to make it available and free of charge in current practice.

Abbreviations

MQ	Maternal Questionnaire
SMA	State Medical Assistance (Aide Médicale de l'Etat in French)
FPPC	Father's Prenatal Prevention Consultation
CI	Confidence Interval
OR	Odd Ratio
GP	General Practitioner

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-024-20388-x>.

Additional file 1. Maternal Questionnaire.

Additional file 2. Women's complete characteristics by partner's attendance.

Additional file 3. Multivariate models.

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Authors' contributions

Conceptualization: PP, ADL, GJ, AG, TP. Data curation: PP, TP, RH, AG, GJ, CT, VAL. Formal analysis: PP, ADL. Funding Acquisition: PP, PEM. Investigation: VAL, CT, GJ, AG. Methodology: PP, ADL. Project administration: PP, GJ, AG, PEM, BR. Software: TP. Supervision: ADL. Writing-original draft: PP, ADL. Manuscript revisions: PP, ADL.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

The French Data Protection Authority (CNIL, registration number 921135) and the French Personal Data Protection Committee (Comité de Protection des Personnes, registration number 21.01.19.44753 amended by 21.05022.944753 decision, allowing and increased number of inclusions and additional data collection) gave full ethical approval. Pregnant women and fathers-to-be included in the study gave their consent after being fully informed.

Consent for publication

Participants consent to publication is not required, as no identifying information is provided. All co-authors have reviewed and approved the submitted manuscript.

Competing interests

The authors declare no competing interests.

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