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► To cite this version:

Rémi Houpert, Marc-Karim Bendiane, Laetitia Huiart, Anne-Deborah Bouhnik, Caroline Alleaume, et al.. Socioeconomic and cultural factors associated with pap smear screening among French women living in Réunion Island. *BMC Public Health*, 2024, 24 (1), pp.1125. 10.1186/s12889-024-18633-4 . hal-04713724

HAL Id: hal-04713724

<https://hal.science/hal-04713724v1>

Submitted on 20 Jan 2025

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RESEARCH

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Socioeconomic and cultural factors associated with pap smear screening among French women living in Réunion Island

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Abstract

Background Réunion Island is a French overseas territory located in the southern Indian Ocean, with a challenging socioeconomic and multicultural context. Compared to mainland France, Réunion has an overincidence and overmortality of cervical cancer. In order to investigate these two issues, it is important to evaluate the barriers and potential levers to Pap smear screening among female inhabitants of the island. We aimed to identify the specific socio-demographic factors, cultural factors, and living conditions associated with Pap smear screening in Réunion, with a view to increasing uptake.

Methods We conducted a Knowledge Attitude Behavior and Practices (KABP) survey on cervical cancer screening practices among women aged between 25 and 65 years old living in Réunion Island, selected using random digit dialing sampling. Data were collected using Computer Assistant Telephone Interviews. Weighted chi-squared tests and Student's t-tests were used to compare women who had up-to-date Pap smear screening with women who did not. Weighted logistic models were used to identify the factors associated with not having up-to-date screening.

Results A total of 1000 women were included in the study. Of these, 88.1% had a Pap smear test during the previous three years. Factors independently associated with not being up to date were as follows: aged over 55 (AOR 2.3 [1.2–4.3]), no children (AOR 2.5 [1.4–4.3]), having free universal health coverage (AOR 1.7 [1.1–2.7]), an income per unit consumption lower than 1500€ per month (AOR 2.0 [1.1–3.7]), low health literacy (AOR 2.7 [1.7–4.1]), not consulting a general practitioner in the prior 12 months (AOR 3.6 [2.0–6.5]), and a BMI > 30 (AOR 2.6 [1.5–4.4]).

Conclusions This is the first large-scale survey focusing on recommended Pap smear screening uptake in Réunion Island. Although self-reported screening incidence was higher than in mainland France, national screening policies must take into account the island's diverse social and cultural characteristics (e.g., an ageing population, low health literacy), while implementing actions to fight against poverty and increase general access to healthcare.

Keywords Cervical cancer, Pap smear screening, Reunion Island, Health behaviors

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Background

In France, of the approximately 3,000 women diagnosed with cervical cancer (CC) each year, 1,000 die from it. CC is the 12th leading cause of death by cancer among women in the country. Réunion Island (Réunion hereafter) is a French overseas administrative territory located in the southern Indian Ocean (Supplementary file 1). There is full continuity in state policies and services between the mainland and the island. CC is the 4th most common cancer among women in Réunion, and there is a significant overincidence compared with mainland France [1]. Specifically, the age-standardized incidence rate of CC in Réunion in 2017 was 9.7 per 100,000 person-years, compared with 6.1 in 2018 in mainland France. Moreover, this rate was 4.4 per 100,000 person-years in 2013–2015, double that observed in mainland France [2, 3].

The population of Réunion (850,727 inhabitants in January 2023) is relatively young for a developed country (30% are aged under 20 years) and is very cosmopolitan. There are six main ethnic groups and four main religions (Islam, Christianity, Buddhism, and Hinduism), the consequence of European, African, Malagasy, Indian and Chinese migrations over the past 350 years. The island has some of the poorest socioeconomic indicators in France, with an unemployment rate estimated at 17% in 2022, and 36% of the population living below the French metropolitan poverty threshold in 2020. In addition, due to its mountainous geography and the lack of public transport, some rural populations are isolated and have limited access to healthcare services. Consequently, socio-economic disparities are particularly significant, and are largely responsible for social and territorial disparities in terms of health. These disparities can be seen in the levels of personal exposure to health risk factors, including genetic components [4], health behaviors [5], cancer experience [6] and individual screening strategies [7].

Despite the recent introduction of vaccination against human papillomavirus (HPV), Pap smear screening remains the only reliable means of cervical cancer prevention. It has greatly helped to reduce cervical cancer incidence and mortality, particularly in developed countries [8, 9]. In Réunion, vaccination against HPV began in 2007 and is aimed at people aged 15–18. Vaccination coverage was estimated at 24% [10] and screening coverage was estimated at 60% in 2017 in Réunion [11], far from the national target of 81.4% for screening [12].

For many years, public health interventions have been implemented in French mainland and overseas territories by successive governments to provide access to facilities offering adequate cancer prevention and effective treatment [13]. One example is the CC screening program; initiated in 2018, its aim is to complement spontaneous

screening services by inviting women aged 25 to 65 years old who are not up-to-date with their Pap smear screening, to perform either a Pap test or a HPV test every 3 to 5 years, depending on their age and most recent screening result. However, results to date for this program have been underwhelming, given the resources allocated (including the mobilization of local actors). Coverage rates are still low, and the continued declining trend in Pap smear screening uptake is a growing public health issue [12].

Many barriers to Pap smear screening have been documented in the literature, including socio-demographic factors, health behaviors, health status, poor knowledge of CC and its treatment, socio-cultural factors, and equipment limitations [14–16].

To date, only one qualitative anthropological study, conducted in 2002, has focused on Pap smear screening uptake in Réunion. It found two attitudes which were age dependent. Specifically, women under 50 years old (a sub-population with a better understanding of their sexuality and femininity) were more receptive to screening, while older women (who had more traditional psychosociological values) felt less concerned by the disease, were more open to the idea of mortality, and were less inclined to go for screening [17].

Considering the particular context of Réunion, as discussed in the previous paragraphs, it is important to identify the specific socio-demographic factors, cultural factors, and living conditions associated with Pap smear screening, with a view to increasing uptake. Given the many native ethnic and religious minorities in this local insular population, we hypothesize that it has a specific social organization which is based on the historic relationships between these minorities [18]. Accordingly, we aimed to determine the relative contribution of different kinds of social and cultural factors to CC screening behaviors of the women living in Réunion, taking into account not only ethnicity but also religion [19]. This latter element comprises a new challenge in epidemiology in the French context.

Methods

Study design

FOSFORE is a Knowledge Attitude Behavior Practices (KABP) survey on CC screening practices which was conducted in 2017 among women living in Réunion Island [20]. Data were collected between March and June 2017 using telephone interviews among a sample of residents, aged between 25 and 65 years. Eligibility criteria were being able to speak French or Creole, having the physical and cognitive capacity to answer a telephone-based questionnaire, and no history of hysterectomy or uterine conization. Given that a very large majority of

households in Réunion only have mobile phones (84% in 2023) [21], we constituted our random sample based on the following two sampling frames [22]: (i) households subscribing to a land-line operator, with or without a mobile line, and (ii) women who only had a mobile phone number. When contacting land-line numbers, random selection among all eligible women in the household was performed using the usual Random Digit Dialing (RDD sampling rules [23].

We calculated that a study sample of 1000 women was required [24, 25]. Details of the sample calculation are explained in the Supplementary file 2.

Measures

The telephone interviews included between 75 and 150 questions relating to socio-demographic characteristics, living conditions, health, utilization of health services, disease prevention practices, religious beliefs, knowledge and beliefs about CC, and attitudes towards Pap smear screening. Most were closed questions with response scales or multiple-choice answers.

Up-to-date pap smear screening

As part of the health-based questions, women were asked if they had ever had a Pap smear screening (yes / no / does not know). Those who answered “yes” then indicated how long it had been since their last test (less than 1 year / between 1 and 2 years / between 2 and 3 years / between 3 and 5 years / more than 5 years / does not know). In accordance with French guidelines [26], persons who reported having a test in the previous 3 years were considered to be up to date with their screening. All others were considered not to be up to date.

Health literacy

Health literacy was measured using the validated French-language version of the third scale (‘Actively Managing my Health’) of the Health Literacy Questionnaire (HLQ) [27]. This scale comprises five items scored on a four-point Likert-type response scale (strongly disagree, disagree, agree, strongly agree). A mean score between 1 and 4 was calculated. A score lower than 3 was considered to represent low health literacy.

Income per unit of consumption

Self-reported income was collected which included all household resources. Income per unit of consumption was calculated by dividing household resources by household weight, calculated as follows: the value 1 for the head of the household, 0.5 for each of the other persons aged 14 years or older, and 0.3 for each child aged under 14 [28]. Households with an income per unit of

consumption below 1500€ were considered to have low incomes.

Frequency of General Practitioner (GP) consultations

Women were asked how many times they had consulted a GP in the preceding 12 months.

Free universal health cover

At the time of this study, several different health allowances existed in France for people on low income. These included complementary health solidarity such as Complementary Universal Coverage (*Couverture Maladie Universelle Complémentaire* or CMUC), assistance with paying health care mutuels (*Aide Complémentaire de Santé* or ACS), and state medical aid for irregular non-French nationals (*Aide Médicale d'état* or AME). Participants who received at least one of these allowances were defined as receiving free universal health cover.

Statistical analyses

A weighting procedure was applied to ensure that the data were representative of the population of Réunion in relation to age and professional activity. Weighted chi-squared tests and Student's t-tests were used to compare women up to date with their Pap smear screening with those who were not. Weighted logistic models were then used to identify factors associated with not being up to date. A step-by-step procedure was performed to select the statistically significant factors to retain in the multivariate model. The significance thresholds were 20% and 5%, respectively, in the univariate and multivariate analyses.

Results

16,711 women were contacted by phone over the four months of data collection, and 7,186 were eligible to participate. Among them, 1,184 agreed to participate in the survey and 184 stopped before the end of completion. Finally, one thousand women were included in the study. Mean age was 43.7 years (SD=11.1), 49.5% had a level of education below upper secondary school certificate, 65.9% were professionally active at the time of the survey, 62.0% had a low income, 60.4% were living with a partner, and 13.1% had no child (Table 1).

Slightly under a third (29.1%) reported having access to free universal health cover, while 92.4%, 60.3%, and 47.5% reported at least one consultation with their GP, dentist, and gynecologist in the previous twelve months, respectively. Overall, 30.7% had low health literacy (mean (SD) score for Scale 3 of the HLQ=3.0 (0.6)). Most (80.7%) of the participants had a religion, the majority of whom were Christian (69.7%).

Table 1 Factors associated with being up to date with Pap smear test or not – univariate analyses – (n = 1000)

	Total %	Up to date with Pap smear test		p ^a
		YES 88.1%	NO 11.9%	
Age (years)				0.038
25-35	27.5	27.4	28.6	
36-45	28.0	29.2	19.3	
46-55	27.1	27.1	26.9	
56-65	17.4	16.3	25.2	
Level of education				0.105
No diploma	29.5	28.0	39.5	
< high school certificate	20.0	20.6	16.8	
high school certificate	18.7	19.3	13.4	
> high school certificate	30.4	31.0	26.9	
Missing	1.4	1.1	3.4	
Religion				0.220
Christian	69.7	69.9	68.1	
Muslim	3.5	3.1	6.7	
Hindu	4.8	5.1	2.5	
Other	2.7	2.6	3.4	
None	19.2	19.2	19.3	
Missing	0.1	0.1	-	
Living as a couple				0.006
No	39.6	38.0	51.3	
Yes	60.4	62.0	48.7	
Children				<.001
None	13.1	11.8	22.7	
1 or 2	51.8	53.6	38.6	
3 or more	35.1	34.6	38.7	
Professional situation				<0.114
Active	65.9	67.0	57.6	
Inactive	27.4	26.5	33.9	
Retired	6.4	6.1	8.5	
Missing	0.3	0.4	-	
Income per consumption unit (€)				<.001
< 1500	62.0	60.2	75.4	
≥ 1500	29.8	31.7	16.1	
Missing	8.2	8.1	8.5	
Free universal health coverage				0.003
No	70.6	72.2	58.8	
Yes	29.1	27.6	40.3	
Missing	0.3	0.2	0.9	
Adequate health literacy				<.001
No	30.7	28.5	47.1	
Yes	65.9	68.2	48.7	
Missing	3.4	3.3	4.2	
Consulted a GP at least once in the previous 12 months				<.001
No	7.6	6.2	17.6	
Yes	92.4	93.8	82.4	

Table 1 (continued)

	Total %	Up to date with Pap smear test		p ^a
		YES 88.1%	NO 11.9%	
Consulted a dentist at least once in the previous 12 months				0.028
No	39.4	38.1	51.3	
Yes	60.3	61.5	48.7	
Missing	0.3	0.4	-	
Consulted a gynaecologist at least once in the previous 12 months				<.001
No	51.9	46.7	90.8	
Yes	47.5	52.7	9.2	
Missing	0.6	0.6	-	
Up to date with mammography screening				<.001
No	20.9	9.1	32.8	
Yes	11.9	22.2	10.9	
Not concerned (age<50)	67.2	68.7	56.3	
BMI				<.001
Underweight	4.6	4.5	5.0	
Normal	51.4	53.0	40.4	
Overweight	27.8	28.1	25.2	
Obese	16.2	14.4	29.4	
Already heard about HPV vaccine				<.001
No	36.5	33.9	55.5	
Yes	63.0	65.9	42.0	
Missing	0.5	0.2	2.5	

^a calculated excluding missing values

Almost all the participants (96.2%) had already had a Pap smear test during their lifetime. Of these, 88.1% were up to date while 8.1% were not.

Table 1 present the univariate analyses of the factors associated with not being up to date.

Women not up to date were more likely to be aged over 55 years (25.2% versus 16.3% $p=0.038$), but less likely to be aged between 36 and 45 years (19.3% versus 29.2%, $p=0.038$).

Moreover, not living with a partner, not having children, having health literacy difficulties, an income per unit consumption beneath 1500€, and access to free universal health cover, were all associated with a higher likelihood of not being up to date.

In contrast, consulting a GP, a dentist or gynecologist in the 12 months prior to the survey, having heard about HPV vaccine, having a normal BMI, and - for women over 50 years - being up to date with recommended mammogram screening, were all associated with a higher likelihood of being up to date.

Finally, no relationship was found between Pap smear screening and religious beliefs or with education level.

After multiple adjustment, the factors associated with not being up to date with Pap smear screening were as follows: over 55 years, childless, receiving free universal health cover, having a low income, having low health literacy, not consulting a GP in the previous 12 months, and having a BMI > 30 (Table 2).

Discussion

This is the first large-scale survey focusing on recommended Pap smear screening in Réunion. Despite random sampling, one of the major limitations was the lack of representativeness of some religious minorities such as Muslims and Hindus, and vulnerable hard-to-reach sub-groups including migrants, very low-income families, and non-French/Creole speaking people (Supplementary file 3). Other limitations mirror those usually associated with RDD household surveys. Specifically, questions on sensitive issues, like sexual relations, often generate inexact estimations because of social desirability bias [29]. Accordingly, as Pap smear screening was

self-reported, the assessed coverage rate (88.1% vs. 60% in previous survey) may have been overstated because of this bias. Despite these limitations, the study design ensured that results could be compared at the national and international levels. To ensure sub-national and international comparability of cancer-related health behaviors in France, the “Baromètre Cancer” cross-sectional telephone survey was introduced by the second national cancer plan (2009–2013) and definitively incorporated into government cancer strategies through the third cancer plan (2014–2019) [30, 31]. FOSFORE, which focuses on CC prevention practices, has therefore followed the design rules of the “Baromètre Cancer” to ensure the comparability and external validation of its results. Consequently, they can provide specific comparison-based information on individual and social factors associated with screening behaviors among in this overseas population.

Social inequality is a major determinant of population health [32–34], and many studies have reported that socioeconomic status (SES) has a significant impact not only on cancer diagnosis, treatment and mortality [35–37], but also on cancer prevention, including screening behaviors and practices. In high-income countries, low screening coverage is related to current health and social inequalities [38]. Our results on the association between SES and CC screening behaviors reflect the literature [14, 39, 40]. Specifically, we found that SES disparities were more strongly associated with Pap smear screening uptake in Réunion than in mainland France, irrespective of culture and religion. However, we did not find any significant relationship between culture or religion. This would suggest that in order to improve screening we must first and foremost consider a woman’s SES (which we measured by two proxies in the present study: receiving free universal health coverage (or not) and low income (or not)).

Moreover, despite comprehensive national (i.e., covering the mainland and overseas territories) policies on access to health care in France, real-world access for women living in overseas territories is more difficult due to a high level of social vulnerability (higher unemployment rates, higher cost of living, etc.) [41, 42]. Given the relatively low uptake of Pap smear screening by socioeconomically vulnerable women in Réunion, the French health care system must promote tailored interventions able to respond to this population’s specific needs [43].

In our study, women over 55 years old were significantly less likely to be up to date with their Pap smear screening, which is consistent with the most recent French national observational survey on cancer [12]. There are several factors which may explain this finding, including an ever-decreasing number of gynecological

Table 2 Factors associated with not being up to date with Pap smear test – multivariable analyses – ($n = 961^{*a}$)

	Adjusted OR	CI (95%)	p
Age classes (years)			0.003
25-35	1		
36-45	0.68	0.36-1.26	
46-55	1.37	0.77-2.42	
56-65	2.31	1.23-4.31	
Children			0.002
None	2.46	1.41-4.30	
1 or more	1		
Free universal health coverage			0.023
No	1		
Yes	1.71	1.08-2.71	
Income per consumption unit (€)			0.047
< 1500	2.05	1.14-3.67	
≥ 1500	1		
Missing	2.18	0.91-5.24	
Health literacy difficulties			<.001
Yes	2.68	1.74-4.12	
No	1		
Consulted a GP at least once in the previous 12 months			<.001
No	3.60	1.99-6.51	
Yes	1		
BMI			0.003
Underweight	1.32	0.50-3.49	
Normal	1		
Overweight	1.07	0.63-1.80	
Obese	2.57	1.51-4.37	

^a $n = 961$, total sample calculated excluding missing values

consultations [44], and fewer problems associated with menstrual disorders [45]. Our findings highlight the importance for all healthcare providers - in particular GP - to pay more attention to women over 55 years old, given their higher risk of CC [46].

In line with previous studies, our multivariate analysis showed that regularly consulting a GP could play a major role in improving Pap smear screening uptake [47]. However, a recent French study concluded that the absence of regular consultations with a healthcare practitioner (including GP) cannot fully explain why some women do not go for screening [48]. Only implementing interventions to solve problems associated with medical demography (e.g., a lack of GP and of medical staff.) is certainly not sufficient to guarantee optimal screening coverage.

Several individual factors, including empowerment and health literacy, can play a role in women's uptake of Pap smear screening. Empowerment is essential in this context, as shown by the negative impact of difficulties in actively managing one's health (see scale 3 of the HLQ) in our study. Health literacy is not only about accessing and understanding health information; it involves motivation and the competency to appraise and apply information for decision-making [49]. Most studies in the last decade have focused on lower income and level of education as barriers to Pap smear screening (and cancer screening in general) without investigating the influence of low health literacy [50]. Long-term plans to increase all domains of health literacy in the general population and specific interventions to help women with low literacy could lead to increased screening uptake. Furthermore, national screening campaigns must be adapted to local populations in terms of their level of health literacy. As one might have expected given the context [51], the level of health literacy (mean = 3.0 for scale 3 of the HLQ) in our survey was lower than that recorded in the general Australian population (mean = 3.09, mean in the first quintile of equalized income of household = 3.02) [52]. This level was also lower than that in a small sample of citizens from a deprived borough in mainland France (mean = 3.2) [53].

To understand the role played by women's weight in Pap smear screening uptake, a systematic review exploring attitudes toward preventive behaviors showed that women with overweight are less likely to go for screening. The authors suggested that poor body self-image and negative experiences during gynecological examinations were partly to blame for this [54], and underlined the need for professionals to take into account possible patient embarrassment. These findings are consistent with our survey, where women with a high BMI in Reunion are less likely to be up to date with their smear tests. These findings were also confirmed by a French study

on cervical cancer screening among women living in overseas territories [11, 55], where obesity was a socio-demographic factor significantly associated with non-completion of recent screening. To increase Pap smear screening uptake by this population, targeted interventions are needed.

Multivariate analysis showed that having children was positively associated with Pap smear screening in our study. Previous published research on adult daily life habits, such as tobacco smoking, concluded that having children is associated with better disease prevention health behaviors [56]. This could mean that women with parental responsibilities are more attentive to their own health.

Finally, our study comes after 10 years of awareness-raising on the HPV vaccination recommendation in France and in Réunion for girls aged 11 to 14 (started in 2007), and highlights better Pap smear screening coverage in Réunion (88.1% vs. 76.8%) than in metropolitan France [12]. This coverage rate is overestimated due to social desirability and lack of representativeness. In these 10 years, the national recommendation has sufficiently covered the women who responded to our survey and could not change the results obtained. Nevertheless, there is still an over-incidence of CC (and an incidence of CC-related mortality) on the island, just as is the case in other French overseas territories. In addition, despite the effectiveness of the vaccine, HPV vaccination coverage in Réunion, as in mainland France, remains woefully inadequate. Around 14% of girls on Reunion Island, compared with 41.5% in mainland France [10, 11]. It is therefore essential to acquire a much greater understanding of the continued reluctance of some women in these areas to go for screening.

Conclusions

The diversity of factors influencing health behaviors, and in particular screening practices among women, make it difficult to adequately implement health interventions to improve screening uptake, both in mainland France and the country's overseas territories, including Réunion. In terms of the latter territory, national policies to increase Pap smear screening uptake must take into account the island's diverse social and cultural characteristics (e.g., an ageing population, low health literacy), while implementing actions to fight against poverty and increase general access to healthcare.

Abbreviations

AME	Aide Médicale d'Etat
BMI	Body Mass Index
CC	Cervical Cancer
FOSFORE	Freins et leviers au dépistage par Frottis cervico-utérin du cancer du col de l'utérus à la Reunion
GP	General Practitioner
HLQ	Health Literacy Questionnaire

HPV	Human Papilloma Virus
KABP	Knowledge, Attitudes, Behaviors and Practices
RDD	Random Digit Dialing
SD	Standard deviation
SES	Socioeconomic Status

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12889-024-18633-4>.

Supplementary Material 1.

Supplementary Material 2.

Supplementary Material 3.

Acknowledgements

We thank all the women who responded to the survey. We also thank the Institut de sondage SYNTHÈSE (Eric Bertrand, Romuald. and the interviewers), members of the project team (Léa Bruneau, Dominique Rey, Cyril Ferdynus), and Jude Sweeney (Milan, Italy) for the English revision and copyediting of the manuscript.

Authors' contributions

MKB, LH, ADB and EC contributed to the study conception and design, to the interpretation of the results and to the writing of the manuscript. ABD also performed the final statistical analysis. CA contributed to data collection and writing. RT participated in data management, statistical analysis, and writing. RH participated in the analysis and interpretation of results and drafted the final manuscript. JM, CJ and JVB, revised the analyses and the manuscript critically for important intellectual content. All authors read and approved the final manuscript.

Funding

This work was supported by the French National Cancer Institute (INCa, grants DEPREV2014 and SHSESP2019-177).

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available, but can be made available from the corresponding author on reasonable request.

Declarations

Ethical approval and consent to participate

The study was approved by the Inserm Ethics Committee (No 16–302 of 06/07/2016) and authorized by the Commission National Informatique et Liberté (CNIL) N°1931486v0 of 24/02/2016. Oral informed consent was acquired prior to the telephone interviews.

Consent for publication

Not Applicable.

Competing interests

The authors declare no competing interests.

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Received: 12 December 2023 Accepted: 16 April 2024
Published online: 23 April 2024

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