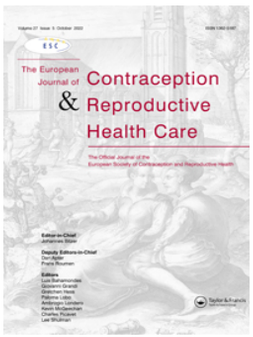

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CLINICAL STUDY

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Knowledge, professional attitudes, and training among health professionals regarding male contraceptive methods

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ABSTRACT

Objectives: Health professionals are at the forefront of information and acceptability regarding contraceptive methods, however only one study evaluated their knowledge of male contraception (MC) including hormonal MC (HMC) and thermal MC (TMC). Our objective was to evaluate the knowledge, professional attitudes, and training of French practitioners regarding the management of couple contraception by male contraception (MC).

Study design: We designed a descriptive, cross-sectional, multicentre study in 2,396 French practitioners belonging to national or regional institutions involved in contraception. We solicited practitioners by e-mail to complete an anonymous questionnaire; we analysed their knowledge, professional attitudes, and training regarding the management of couple contraception by MC.

Results: The overall participation rate was 18% (427/2,396). Condoms, withdrawal, and vasectomy were known by 98%, 89%, and 76% of the population, respectively. Hormonal MC and Thermal (TMC) were known by 10% and 24% of the population, respectively. Fifty-five percent of the population never or infrequently offered MC during a couple's contraceptive request consultation. Only 14% of the population had ever participated in training on MC; 96% wanted to be better trained on MC, and 87% expressed a willingness to participate in training on the subject.

Conclusions: Health professionals involved in contraception have unsatisfactory knowledge about MC methods based on spermatogenesis inhibition and are eager to have more information about them. To advance the acceptability and dissemination of MC methods, it seems imperative to enhance research in the field and to provide health professionals with an adapted training programme.

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Contraception; male contraception; knowledge; providers; training

Introduction

In France and in the world, contraception for couples solely relies on the woman in more than 70% of cases [1,2]. However, since 2012, there has been a change in the contraceptive landscape, with a decline in the use of female oestrogen-progestogen contraception [3,4] and an increase in the use of alternative methods to the pill [5], namely, the male condom and IUD.

The male contraceptive landscape is dominated by condoms and withdrawal, which have poor Pearl indexes, and vasectomy, which is simply a method of sterilisation [1]. Reliable male contraceptive methods have been available for more than 40 years, and at the international level, as in France, the majority of men and women are willing to adopt a male contraceptive method as couple contraception [6–9]. However, although they have been proven to be effective, hormonal male contraception (HMC) [10–12] and thermal male contraception (TMC) [13–15] have not been approved by a stringent regulatory authority other than World Health Organisation for HMC and are currently not included in clinical practice recommendations. But they are still known and used to a limited extent. Indeed, only one study to date has studied the knowledge of health professionals involved in contraception on male contraception (MC), including HMC and TMC, and showed that 25% and 15% of new providers, respectively, were aware of these methods [16].

The massive medicalisation of contraception places health professionals at the forefront in the acceptability [17] and dissemination [18] of a contraceptive method. Nevertheless, there are very few published data on practitioners' knowledge and practices regarding MC.

The main objective of our study was to evaluate the knowledge, professional attitudes, and training of French practitioners regarding the management of couple contraception by MC.

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Materials and methods

Study and population

We carried out a descriptive multicentric cross-sectional study in a medical population of couple-contraception prescribers in France between 21 April 2020 and 15 June 2020.

The inclusion criteria were female and male practitioners of the specialties involved in contraceptive prescription (obstetrician-gynaecologists, medical gynaecologists, general practitioners, or midwives) and belonging to one of the three structures that participated in the study. Urologists were not included among the practitioners surveyed, because today in France contraceptives are mainly delivered by midwives and obstetrician-gynaecologists. No age limit was applied. The exclusion criteria were practitioners from any other medical or surgical specialty of these structures.

The three structures that took part in the survey were:

a. The Mediterranean Network, which is an open structure that covers southeastern France as well as Corsica and the Principality of Monaco. It includes 1039 midwives, 416 general practitioners, and 698 gynaecologists (medical and obstetrician) working in 42 maternity hospitals and five perinatal centres. The network's mission is to coordinate health professionals by drafting recommendations, care, and screening protocols and ensuring their training through the implementation of continuing education activities.
b. The Marseille Provence Medical Gynaecology College, which is a closed structure that groups together only medical gynaecologists from Marseille and the Provence region. It participates in the promotion of knowledge in medical gynaecology and in postgraduate medical training.
c. The centres of the French Movement for Family Planning (MFPF), which involve an open structure that is a branch of the MFPF, subsidised by the local authorities or not, made up of 72 associations in which activists, salaried employees, and volunteers are committed to sex education, information, and support for contraception and abortion.

Practitioners, therefore, belong to regional (the Mediterranean Network and the Marseille Provence Gynaecology College) or national (the MFPF) structures.

Recruitment and questionnaire

We solicited the practitioners by e-mail via the mailing lists of each structure: the Mediterranean Network (2153 practitioners solicited), College of Medical Gynaecology Marseille Provence (148 practitioners solicited), and MFPF (22/72 centres agreed to solicit their practitioners, i.e., 95 practitioners).

An original and anonymous e-questionnaire with e-consent was developed to explore the following: practitioners' attitudes and knowledge about MC, the evaluation of medical training on MC, the influence of initial medical education on prescribers' personal and professional attitudes towards MC, and the influence of personal experiences on attitudes towards MC prescribing.

The questionnaire is presented in its entirety in Supplementary Appendix and consists of three parts (33 questions, 'Q'). The first part, entitled 'You', includes 11 questions about social and demographic information, practitioners' personal experiences with contraception, and the frequency of professional solicitation for couples' requests for contraception. The second part, entitled 'Male Contraception', includes 17 questions assessing their professional knowledge and attitudes regarding MC. The third part, entitled 'Training', includes five questions assessing the training of practitioners in MC.

At the end of the questionnaire, a page of brief information is given on the different MC methods that exist that have been scientifically validated to date. The time required to answer the questionnaire is fewer than 10 minutes.

Data collection

The referents of each structure were contacted by e-mail to present the project; an explanatory text of the study and the link to the digital questionnaire were sent to solicit practitioners via their mailing list.

For each survey participant, e-consent was obtained at the beginning of the online questionnaire. After reading an informative note, the participant could only access the entire questionnaire once consent was acquired. Strictly anonymous responses to the digital questionnaire were collected online using a Google form.

Analytical and statistical tools

First, the characteristics of the study population were described using counts (percentages) for qualitative variables and means ± standard deviations or medians (extremes) when appropriate for quantitative variables.

Second, the practitioners' level of knowledge and frequency of prescribing MC were described using counts (percentages).

Third, to explore professional attitudes according to the characteristics and gender of practitioners, comparisons using χ^2 tests were carried out. To assess the factors influencing the prescription of MC, a multivariate analysis was conducted. The likelihood of often or very often prescribing MC was expressed with odds ratios (OR) with the 95% confidence interval (95% CI). To avoid potential confounding factors, the ORs were adjusted for age $>$ 40 years old, profession, gender, centre, frequency of solicitation for contraception demands, religion, marital status, parenthood, personal history of abortion, and personal history of contraceptive failure.

Finally, a correlation table between the different means of MC and various factors was conducted. The results are expressed using Spearman's Rho (r).

All statistical analyses were bilateral, and results were considered significant when p-values $<$ .05 were obtained. These analyses were performed using IBM SPSS Statistics 20.0 (IBM Inc., New York, USA).

Ethics

The project was approved by the Ethics Committee of Aix Marseille University (file number 2020-01-23-03).

Results

The questionnaire was sent to 2396 practitioners, and 427 responded (overall response rate of 18%): 16% for the Mediterranean Network (350/2153), 52% for the MFPF (49/95), and 19% for the Marseille Provence College of Gynaecology (28/148). Details of the practitioners' responses are presented in Supplementary Appendix.

Population

The overall characteristics of the studied population are presented in Table 1. Female practitioners represented 90% of the population (383/427). The majority of practitioners were midwives and obstetrician-gynaecologists (82%). The vast majority of practitioners were from the Mediterranean Network.

Seventy percent of practitioners 'often' or 'very often' were solicited for a contraceptive request (Q5) (all specialties included, with no significant difference). When asked about the existing contraceptive therapeutic arsenal (Q17), 65% of practitioners felt unequipped regarding current means of male and female contraception (Table 1), and female practitioners (259/383, 68%) reported this significantly more often than male practitioners (19/44, 43%, $p = .004$) (Supplementary Appendix).

Practitioner training in MC

Only 14% of practitioners had ever participated in training on MC (Table 1). A larger percentage (39%) had conducted some personal research, mainly by searching on the Web (59%) and reading scientific publications (58%) (Supplementary Appendix). Most of the practitioners (96%) wanted more training on MC, and 87% expressed a willingness to participate in training on the subject.

Practitioners' knowledge of the different methods of MC

Knowledge about the methods of MC (condom, withdrawal, vasectomy, HMC, and TMC) was homogeneous (no significant difference) among female and male practitioners (Supplementary Appendix). The majority of practitioners had 'very good' or 'good' knowledge of condoms, withdrawal, and vasectomy (Table 2). However, 11% of practitioners reported a low level of knowledge ('none' or 'little' knowledge) about withdrawal and 24% about vasectomy. Most practitioners (90% and 76%, respectively) reported 'little' or 'no' knowledge of spermatogenesis inhibition methods (HMC and TMC).

Frequency of offering the various methods of MC

The frequency of offering the various methods of MC as a response to a couple's contraceptive demand is presented in Table 3.

More than half of practitioners (55%) 'never' or 'infrequently' offered MC during a couple's contraceptive counselling.

Condoms were offered 'often' or 'very often' by 74% of practitioners, but vasectomy was offered by only 28% of

Table 1. Characteristics of the female and male practitioners included in the study.

Total number, *N*	427
Age, mean ± SD (Q2)	41.5 ± 11.5
Sex, n/*N* (%) (Q1)	
Women	383/427 (89.7%)
Men	44/427 (10.3%)
Medical specialty, n/*N* (%) (Q3)	
Medical Gynaecology	34/427 (8%)
Obstetrics and Gynaecology	102/427 (24%)
Maieutic	248/427 (58%)
General medical practice	43/427 (10%)
Structure, n/*N* (%) (Q4)	
Mediterranean Network	350/427 (82%)
French Movement for Family Planning (MFPF)	49/427 (11%)
College of Gynaecology Marseille Provence	28/427 (7%)
Religious practice, n/*N* (%) (Q6)	115/427 (27%)
Personal situation, n/*N* (%) (Q7-9)	
Single	62/427 (15%)
Couple	365/427 (85%)
With children	308/427 (72%)
Parental project	133/427 (31%)
Number of children, median (min–max) (Q8)	2 (0–5)
How often are you asked for contraception, n/*N* (%) (Q5)	
Never	46/427 (11%)
Unfrequently	81/427 (19%)
Frequently	119/427 (28%)
Very frequently	181/427 (42%)
Professional experience about contraception, n/*N* (%)	
Feel unequipped regarding current female and male means of contraception (Q17)	278/427 (65%)
Previous training about male contraception (Q29)	60/427 (14%)
Previous research about male contraception (Q30)	169/427 (40%)
Would like to be better informed about male contraception (Q32)	412/427 (96%)
Would be interested in participating in a training course on male contraception (Q33)	370/427 (87%)

Q: number of the question (see Supplementary Appendix); SD : standard deviation.

Table 2. Level of knowledge of the various methods of male contraception ($n = 427$) (Q12–Q16).

	No knowledge	Little knowledge	Good knowledge	Very good knowledge
Condom, *n* (%)	0 (0%)	7 (2%)	81 (19%)	339 (79%)
Withdrawal, *n* (%)	8 (2%)	39 (9%)	137 (32%)	243 (57%)
Vasectomy, *n* (%)	0 (0%)	104 (24%)	181 (43%)	142 (33%)
Hormonal MC, *n* (%)	190 (45%)	193 (45%)	32 (7%)	12 (3%)
Thermal MC, *n* (%)	162 (38%)	163 (38%)	80 (19%)	22 (5%)

Q: number of the question (see Supplementary Appendix); MC: male contraception.

Table 3. Frequency of offering the various methods of male contraception for couple contraception ($n = 427$).

	Never	Unfrequently	Frequently	Very frequently
Male contraception (including condom) *n* (%) (Q18)	57 (13%)	176 (41%)	128 (30%)	66 (16%)
Condom, *n* (%) (Q19)	5 (1%)	104 (24%)	198 (47%)	120 (28%)
Withdrawal, *n* (%) (Q20)	318 (75%)	95 (22%)	10 (2%)	4 (1%)
Vasectomy, *n* (%) (Q21)	83 (19%)	223 (52%)	101 (24%)	20 (5%)
Hormonal MC *n* (%) (Q22)	393 (92%)	28 (6.5%)	4 (1%)	2 (0.5%)
Thermal MC, *n* (%) (Q23)	350 (82%)	68 (16%)	8 (2%)	1 (0%)

Q: number of the question (see Supplementary Appendix); MC: male contraception.

Table 4. Multivariate analysis of the factors associated with susceptibility to offer male contraception.

	Frequent or very frequent offer of male contraception to couples (Q18)		
	ajusted OR[a]	CI 95%	*p*
Age > 40 years (Q2)	1.337	0.843–2.120	0.217
Occupation (Q3)			
Medical Gynaecology	1.544	0.524–4.544	0.431
Obstetrics and Gynaecology	0.658	0.276–1.570	0.346
Maieutic	1.734	0.810–3.711	0.156
General medical practice	1	–	–
Male practitionner (Q1)	0.668	0.314–1.424	0.296
Structure (Q4)			
Mediterranean Network	1.341	0.491–3.660	0.567
French Movement for Family Planning (MFPF)	2.078	0.665–6.488	0.208
College of Gynaecology Marseille Provence	1	–	–
Often of very often asked for contraception in professional activity (Q5)	1.923	1.221–3.028	0.005**
Religious practice (6)	1.074	0.682–1.691	0.759
Single (Q7)	0.667	0.359–1.239	0.200
With children (Q8)	1.116	0.654–1.904	0.688
Personal history of contraception failure (unwanted pregnancy) (Q10)	0.923	0.364–2.344	0.867
Personal history of abortion (Q11)	1.128	0.385–3.310	0.826

Q: number of the question (see Supplementary Appendix); ** $p < .01$; [a] ajusted Odd Ratio by multinomial logistic regression taking into account all the factors and categories of the table.

practitioners; the main reason for not/infrequently offering vasectomy was a lack of training (Supplementary Appendix, Q24 and Q26). They felt that vasectomy was not a contraceptive method (poor reversibility) and had no corresponding practitioner to whom they could refer patients. For 97% of practitioners, withdrawal was 'never' or 'infrequently' mentioned because they did not have confidence in the effectiveness of this method (Supplementary Appendix, Q25). HMC and TMC were not proposed due to a lack of knowledge about these methods (Supplementary Appendix, Q27-28).

Factors associated with likelihood of offering MC

After multivariate analysis, practitioners who were 'often' or 'very often' asked for contraception were twice as likely to offer MC 'often' or 'very often' (OR [a] = 1.92; 95% CI 1.22–3.03; $p = .005$) (Table 4). Conversely, practice structure and medical specialty did not influence the likelihood of offering MC (no significant difference).

Personal factors did not influence the prescriptive attitudes about MC: age, practitioner gender, personal situation (relationship, child), religious practice, and personal experience with contraception did not influence the likelihood of offering MC (no significant difference).

Discussion

An exhaustive inventory of the knowledge and professional attitudes of French practitioners on contraception and, in particular, MC is neither available nor feasible today. We, therefore, questioned practitioners whose specialties were most concerned with contraception: medical gynaecologists and obstetricians, midwives, and general practitioners.

Representativeness of the population

The studied population was mainly composed of health practitioners in southeastern France. The gender distribution was representative of the midwifery profession (96% of female midwives in our population versus 97% of females in French midwives according to the 2018 report by the Direction of Research, Studies, Evaluation and Statistics [19]) but includes an overrepresentation of women among general practitioners (86% versus 46% [19]), medical gynaecologists (100% versus 74% [19]), and obstetricians (72% versus 51% [19]).

The participation rate in each structure was in line with their contraceptive practices. As practitioners from the MFPF and the College of Medical Gynaecology are particularly solicited for contraceptive requests, their participation rate was higher than in the Mediterranean Network, whose

professional practice is more varied. The Mediterranean Network's participation rate was lower than that of the two other structures. This could be explained by the fact that contraception has only been in the network's objectives for six years.

Level of knowledge, professional attitudes, and practices of different MC methods

The MC methods most commonly known by practitioners were condoms and withdrawal, as already reported in a recent study [16]. There was no difference in the level of knowledge between women and men in our study (Supplementary Appendix).

When asked about the existing female and male contraceptive arsenal, 65% of practitioners felt deprived, an alarming figure given the increasing number of (female) contraceptives available on the market. At equal levels of knowledge, female practitioners reported feeling more deprived than male practitioners (68% vs 43%, respectively). It could, therefore, be assumed that male and female practitioners do not have the same judgement criteria for excluding female contraceptive methods from their proposals. However, this issue must be confirmed in further studies.

Forty five percent of the practitioners 'frequently' or 'very frequently' offered MC during a couple's contraceptive counselling. Condom was by far the most frequently offered method of MC despite a poor Pearl index. Withdrawal, which has approximately the same Pearl index as the condom, was not favoured by practitioners. This suggests that the high recommendation rate for condoms is probably related to their prophylactic, rather than contraceptive functions, as previously reported [16,20].

Vasectomy was infrequently proposed because of its irreversibility. This finding is in line with the recommendations of the World Health Organisation and the American Urological Association, which consider vasectomy as a method of sterilisation [21]. However, the valorisation of the users' choice should imply information on this method as well as on uncertain and payable reversible option, regardless of the professionals' opinions.

HMC and TMC are very infrequently proposed by the practitioners of our study. The two main reasons given by the participants are a lack of information and knowledge about these methods, as reported in previous studies involving young practitioners [16]. This result should be considered in view of the lack of male contraception methods officially approved by stringent regulatory authority (other than World Health Organisation for HMC) [16,22]. Indeed TMC has been preliminarily studied in 3 studies [13–15] which are small cohorts with minimal pregnancy data; HMC is slightly farther along in research with some clinical trials. This suggests the urgent need for research in the field and the large interest in setting up training on these methods.

Among the professional factors, only the frequency of solicitation for contraception clearly influenced the likelihood of offering MC as a couple contraception. Practice structure and medical specialty did not influence the likelihood of offering MC: all health professionals involved in contraception seem to need training on the subject.

Interestingly, personal factors did not influence prescriptive attitudes about MC. In the present study, age, practitioner gender, relationship situation, and personal experience with contraception failure or abortion did not influence the likelihood of offering MC. These results are not in agreement with the 2010 FECOND study [20], which highlighted the influence of the personal experience of contraceptive practitioners on the contraceptive panel offered to patients; nevertheless, this study did not include HMC and TMC.

In our study, personal religious practice did not influence practitioners' professional attitudes towards the prescription of MC. In the general population of contraceptive users, the influence of religious practice on contraceptive behaviour has been highlighted in numerous studies in France and around the world [23]. However, no study has examined the link between the religious practices of the practitioner and their contraceptive prescriptions. The literature is poor on the subject; future work may be of interest to better identify the influence of personal factors on to the likelihood of offering MC.

Practitioner training in MC

Only 14% of the practitioners had ever participated in one or more trainings on MC. This does not seem associated with a lack of investment or willingness from practitioners, as the majority of our population had personally documented their experience, and almost all of them (96%) expressed a desire for better training.

There are few studies on practitioners' professional knowledge and attitudes towards MC. A 2018 study showed that recently trained practitioners had little knowledge of spermatogenesis inhibition methods (HMC and TMC) [16]. These results are similar to the present study, although our population is older, suggesting that current initial medical training is still maladjusted. These data encourage us to better train health professionals in contraceptive issues, particularly through continuing medical education.

Limitations and strengths

One limitation is the low participation rate to the study. As discussed earlier, this could be explained by the fact that contraception has only been in the Mediterranean network's objectives for six years; another explanation is the study period (April–June 2020), in which the clinical practice was impacted by first wave of the Covid-19 pandemic.

Another limitation is that our population was mainly from southeastern France, and this may not be representative of all French practitioners. The gender distribution of our population included an overrepresentation of women among general practitioners, medical gynaecologists, and obstetricians. We did not analyse the responses of practitioners according to their age, although there was a great disparity in age in our population, which could represent a bias. Finally, univariate analysis showed that at an equal level of knowledge, female practitioners offered MC significantly more often than male practitioners (47% vs. 27%, respectively, $p = .033$). This difference in male contraceptive medical practices, according to the gender of the

practitioner, was not confirmed in multivariate analysis. A larger sample with a sufficient number of men may contribute to confirming this trend.

A strength of this study is that it was multicentric and focussed on practitioners whose specialties were most concerned with a demand for couple contraception: Seventy percent of practitioners were very frequently or frequently asked for a couple contraception prescription.

Conclusion

The present results revealed gaps in practitioners' initial medical education regarding MC. The health professionals involved in prescribing contraception declared poor knowledge of spermatogenesis inhibition methods and, to a lesser extent, vasectomy; we confirmed a strong demand for training on MC. In a general context of a desire to share contraceptive responsibilities within couples, our results highlight the urgent need for research in the field of male contraception and for health professionals training. This progress would make it possible to broaden the contraceptive therapeutic arsenal proposed and, thus, offer each couple a better chance of finding the method adapted to their expectations.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

References

[1] UN. Population division. Contraceptive use by method. 2019: data booklet. 2019. https://doi.org/10.18356/1bd58a10-en.

[2] Le Guen M, Roux A, Rouzaud-Cornabas M, et al. [Cinquante ans de contraception légale en France: diffusion, médicalisation, féminisation]. fifty years of legal contraception in France: diffusion, medicalization, feminization. Popul Sociétés. 2017;549(1):1. https://doi.org/10.3917/popsoc.549.0001.

[3] Rahib D, Le Guen M, Nathalie L. [Baromètre santé 2016 Contraception] Health barometer 2016; [cited 2020 May 7]. Available from: Santé Public Fr 2017./determinants-de-sante/sante-sexuelle/barometre-sante-2016-contraception.

[4] Jost S, Le Tohic A, Chis C, et al. [Contraception des femmes françaises de 15 à 45ans: enquête nationale sur un échantillon représentatif de 5963 femmes] contraception of 15–45 years old french women: nation inquiry on a representative sample of 5,963 women. Gynecol Obstet Fertil. 2014;42(6):415–421.

[5] Bajos N, Rouzaud-Cornabas M, Panjo H, et al. [La crise de la pilule en France: vers un nouveau modèle contraceptif ?] the pill crisis in France: toward a new contraceptive model? Popul Sociétés. 2014;511(1):1. https://doi.org/10.3917/popsoc.511.0001.

[6] Martin CW, Anderson RA, Cheng L, et al. Potential impact of hormonal male contraception: cross-cultural implications for development of novel preparations. Hum Reprod. 2000;15(3):637–645.

[7] van Wersch A, Eberhardt J, Stringer F. Attitudes towards the male contraceptive pill: psychosocial and cultural explanations for delaying a marketable product. Basic Clin. Androl. 2012;22(3):171–179.

[8] Glasier AF, Anakwe R, Everington D, et al. Would women trust their partners to use a male pill? Hum Reprod. 2000;15(3):646–649.

[9] Heinemann K, Saad F, Wiesemes M, et al. Attitudes toward male fertility control: results of a multinational survey on four continents. Hum Reprod. 2005;20(2):549–556.

[10] WHO Task Force on Methods for the Regulation of Male Fertility. Contraceptive efficacy of testosterone-induced azoospermia in normal men. The Lancet. 1990;336:955–959. https://doi.org/10.1016/0140-6736(90)92416-F.

[11] World Health Organization Task Force on Methods for the Regulation of Male Fertility. Contraceptive efficacy of testosterone-induced azoospermia and oligozoospermia in normal men. Fertil Steril. 1996;65:821–829. https://doi.org/10.1016/S0015-0282(16)58221-1.

[12] Gu Y, Liang X, Wu W, et al. Multicenter contraceptive efficacy trial of injectable testosterone undecanoate in Chinese men. J Clin Endocrinol Metab. 2009;94(6):1910–1915.

[13] Mieusset R, Grandjean H, Mansat A, et al. Inhibiting effect of artificial cryptorchidism on spermatogenesis. Fertil Steril. 1985;43(4):589–594.

[14] Shafik A. Testicular suspension as a method of male contraception: technique and results. Adv Contracept Deliv Syst. 1991;7(3–4):269–279.

[15] Mieusset R, Bujan L. The potential of mild testicular heating as a safe, effective and reversible contraceptive method for men. Int J Androl. 1994;17(4):186–191.

[16] Amouroux M, Mieusset R, Desbriere R, et al. Are men ready to use thermal male contraception? Acceptability in two French populations: new fathers and new providers. PLoS ONE. 2018;13(5):e0195824.

[17] Glasier A. Acceptability of contraception for men: a review. Contraception. 2010;82(5):453–456.

[18] Kalampalikis N, Buschini F. [La contraception masculine médicalisée: enjeux psychosociaux et craintes imaginaires] The male medical contraception: psychosocial issues and imaginary concerns. Nouv Rev Psychosociologie. 2007;4:89–104.

[19] DRESS. [Effectifs des médecins par spécialité, mode d'exercice, sexe et tranche d'âge. 2018]. 2018. Headcount of physicians by specialties, practice type, gender and age.

[20] Roux A, Ventola C, Bajos N. [Des experts aux logiques profanes: les prescripteurs de contraception en France]. Experts with profane logic: prescribers of contraception in France. Sci Soc Sante. 2017;35(3):41–70.

[21] Sharlip ID, Belker AM, Honig S, et al. Vasectomy: AUA guideline. J Urol. 2012;188(6 Suppl):2482–2491.

[22] Reynolds-Wright JJ, Anderson R. Male contraception: where are we going and where have we been? BMJ Sex Reprod Health. 2019;45(4):236–242. bmjsrh-2019-200395.

[23] Moreau C, Trussell J, Bajos N. Religiosity, religious affiliation, and patterns of sexual activity and contraceptive use in France. Eur J Contracept Reprod Health Care off J Eur Soc Contracept. 2013;18(3):168–180.