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« I quit the pill » : what can science say?

A netnography versus a literature review

INTRODUCTION

Contraception (or birth control) is a term designating different methods aimed at avoiding pregnancy. In France, medically monitored contraception has been authorized since enactment of the Neuwirth law in 1967^{1,2}. Currently predominant reversible methods include oral contraception (OC), subdermal implant, the intra-uterine device (IUD), the condom, and “morning after” or “emergency” contraception, which is either hormonal or mechanical (copper IUD). As regards oral contraception by means of “the pill”, combined estrogen-progestin oral contraceptives (COC) are to be distinguished from pure progestosterone-only pills (POP). In 2013, they were utilized by 8.9% of women in the world, particularly in countries enjoying a high level of socio-economic development (Europe, North America, Oceania)³. In France in 2013, OC represented 42.7% of the methods used, far ahead of the IUD (25.4%) and the male condom (12.5%)⁴. As for non-reversible female or male means of contraception, such as tubal ligation or vasectomy respectively, they are seldom utilized in France (4.5% of women, especially after the age of 40, for tubal ligation, and 0.8% of men, for vasectomy)^{5,6}.

However, subsequent to the 2012-2013 mediatized events reporting the adverse effects (AE) of third and fourth-generation pills, French wom-

en's contraceptive behavior seems to have changed. According to the 2016 Baromètre Santé (health barometer), between 2010 and 2013 the percentage of women taking the pill declined, often replaced by the male condom in women under 30 and by the IUD in women over 30 years of age⁵.

These developments may have intensified distrust toward long-term hormonal birth control, distrust quite possibly conducive to the use of less effective contraception and to an increased number of unwanted pregnancies and eventually, of voluntary termination of pregnancy (elective abortion). For example, the Pearl index (number of pregnancies among 100 women employing a given contraceptive method) for the male condom is markedly higher than the index pertaining to pills (15 versus 9)⁷.

What can be said to women thinking about putting an end to their long-term oral contraception, of which they fear the potential adverse effects? On the basis of what data can health professionals favor an informed contraceptive choice in the framework of shared medical decision-making?

The objective of this study was to compare women's fears and beliefs regarding long-term oral contraception (OC) to the adverse effects (AE) reported in the relevant scientific literature.

MATERIALS AND METHODS

To fulfill this objective, the

study was carried out in two phases.

During the first phase, netnography, a qualitative research method using the internet as a source of data drawn from virtual communities, was applied with regard to French-language blogs making reference to contraception, excluding those written out by health professionals⁸. Data collection was carried out via the Google[®] search engine using the keywords “blog arrêt pilule” (pill termination blog) to locate e-conversations mentioning the subject. E-conversations appearing on the first six identified blogs covering the last five years (2014 through 2018) were retained for study. Out of the first six e-conversations found, one was excluded because it represented an opinion piece on contraception and had been written by a blogger who was already author of one of the five other e-conversations. All in all, five e-conversations were retained in the netnography, and they included a total of 746 commentaries⁹⁻¹³. After their having been read, a number of terms suggesting an AE ascribable to OC and liable to favor OC cessation were taken note of. Reasons for distrust were then grouped together in large-scale categories issued from rapid reading of the e-conversations, and the terms “acne”, “cancer”, “embolism”, “mood”, “libido”, “natural” and “weight” were searched for via the “search” function (Ctrl F). The terms “religion” and “social level” were searched for but not found.

Steps	MeSH keywords	Refer- ences
1	Contraception	17, 18, 21, 24, 30, 31, 34, 36, 38, 39, 40, 41, 52, 53, 56, 57, 58, 59, 60, 63, 64, 65, 78
2	Contraception, refusal	54, 55
3	Contraceptives, oral	23, 25, 28, 33, 35, 37, 42, 46, 48, 49, 50, 51, 61, 62, 66

Table 1 - The steps of bibliographic research

Name of blog, author and age	e-conversation studied, date and URL (English translation in Table 3)
Les filles électriques Pryska Ducoeurjoly (33 yrs)	Le non-choix de la contraception9 May 2016 https://www.lesfilleselectriques.com/2016/05/le-non-choix-de-la-contraception/
Dis oui Ninon Ninon (25 yrs)	J'ai décidé d'arrêter la pilule10 January 2017 https://disouininon.com/jai-decide-darreter-la-pilule/
Simplement claire Claire (25 yrs)	Pourquoi est-ce que j'arrête la pilule contraceptive ?11 March 2017 http://simplementclaire.fr/arreter-la-pilule-
Le Nouvel Observateur Chloé Pilorget-Rezzouk (–)	J'ai arrêté la pilule pour voir à quoi ressemblerait mon corps sans12 September 2017 https://www.nouvelobs.com/j-ai-arrete-la-pilule-pour-voir
Noholita Camille alias Noholita (27 yrs)	Mon arrêt de la pilule13 October 2017 http://www.noholita.fr/arret-de-pilule/

Table 2 - Characteristics of the e-conversations studied (classified by date)

During the second phase, systematic review of the literature was carried out in accordance with the rules defined in the Cochrane manual and reported in accordance with the PRISMA statement^{14,15}. Were explored: the Medline and Cochrane Library data bases; the French reviews *exercer*[®], *Médecine*[®] and *Prescrire*[®], the institutional sites (HAS, INPES, OMS and NICE) as well as the “gray” university literature (HAL data base). The MeSH terms used were “contraception AND refusal” and “contraceptives AND oral” for the scientific data bases and the review *Prescrire*[®]. As concerns the reviews *exercer*[®] and *Médecine*[®], the keyword “contraception” was used. Works published in French and English from January 2012 to April 2018, accessible free of charge in their integrality and having to do with long-term OC were retained for study, whereas those pertaining to contraception brought about by

exposure to teratogenic treatment were excluded. The different steps in bibliographic research are described in Table 1. The articles' quality and level of evidence were then assessed in accordance with the HAS criteria¹⁶. Netnography results were initially compared to the AEs reported in the literature and subsequently to those reported in the review *Prescrire*[®], which regularly informs readers on pharmacovigilance developments and events emanating from patients and data collection organizations^{17,18}. With regard to a review of the literature and an anonymous record of electronic conversations accessible to one and all, it was not necessary to address a declaration to the CNIL, an ethics committee or a committee for protection of persons concerned.

RESULTS

The characteristics of the 5 blogs studied and the e-

conversations included in the analysis are described in Table 2. The frequency of reasons for distrust is indicated in Table 3. In the blogs, except for “Jasmine”[®] (COC) and “Cérazette”[®],^{9,11} (POP), no distinction is made between COC and POP. That is why, later on in the current study, as a rule OC will be mentioned without specification of its type. Review of the literature identified 1969 articles, of which 1935 were excluded from one reading to the next. After addition of 6 articles transmitted from one person to another, 40 articles, theses and recommendations were retained for study (Figure). Article characteristics and their level of evidence appear in Table 4.

Frequency of AE occurrence and comparison between netnography and the literature review are specified in Table 5.

The following paragraphs present the results issued from quantitative analysis pertaining to each of the assigned categories.

The pill yields pimples!

Acne is often mentioned in netnography: “two years of age, which I was spared as a teenager”⁹.

The data in the literature are contradictory. According to *Prescrire*[®], this AE is ascribed to androgenic progestins such as lévonorgestrel^{19,20}.

However, in the literature review of Kettani et al., bringing together 377 articles, 9 trials have shown fewer lesions and less severe acne using COCs without any difference between progestin generations²¹.

Most acnes occur during adolescence, the period during which OC is initiated, a fact that may distort explanation of acne outbreak. In France as of now, the cyproterone acetate-ethynyl estradiol association has yet to receive market authorization (MA) for acne treatment but is indicated due to its contraceptive effect in several European countries²².

The pill wreaks havoc on periods!

Dysmenorrhea and amenorrhea are major preoccupations. One blogger wrote: “I cannot master my hormonal



Name of blog and author	e-conversation studied and date	Occurrence of terms searched		
Les filles électriques Pryska Ducoeurjoly	Le non-choix de la contraception (<u>not choosing contra- ception</u>) May 2016	Acne: 4 Cancer: 0 Embolism : 1	Mood: 2 Libido: 3	Natural: 7 Weight: 8
Dis oui Ninon Ninon	J'ai décidé d'arrêter la pilule (<u>I decided to stop taking the pill</u>) January 2017	Acne: 11 Cancer: 4 Embolism: 3	Mood: 18 Libido: 46	Natural: 19 Weight: 14
Simplement claire Claire	Pourquoi est-ce que j'arrête la pilule contraceptive? (<u>why I stopped taking the pill</u>) March 2017	Acne: 4 Cancer: 16 Embolism: 3	Mood: 17 Libido: 10	Natural: 19 Weight: 4
Le Nouvel Observateur Chloé Pilorget-Rezzouk	J'ai arrêté la pilule pour voir à quoi ressemblerait mon corps sans (<u>I stopped taking the pill to see what my body would be like without it</u>) September 2017	Acne: 0 Cancer: 0 Embolism: 0	Mood: 0 Libido: 2	Natural: 0 Weight: 3
Noholita Camille alias Noholita	Mon arrêt de la pilule (<u>my pill cessation</u>) October 2017	Acne: 142 Cancer: 4 Embolism: 3	Mood: 30 Libido: 23	Natural: 52 Weight: 48

Table 3 - Occurrence of the adverse effects cited in netnography

month after month”.

Several studies have dealt with the impact of OC on the menstrual cycle. A meta-analysis of 7 studies showed a reduction of primary dysmenorrhea using COC with an odds ratio (OR) between 0.3 and 0.821. A similar effect of COC is also cited in Prescrire® making reference to the American Medical Association Drug Evaluation. It is now used in routine practice, particularly by young women. After three months of utilization, POP has been found to reduce menstrual flow by 87%, and POP by 35 to 68% at one year²¹. According to a Cochrane review, irregular and possibly absent bleeding is one of the first causes of POP cessation²³.

The blood losses occurring during COC intake actually represent withdrawal bleeding, which has been “thought out” so as not to disturb women. In fact, regular periods are experienced as criteria of non-pregnancy and good health. In some cultures, they are viewed as a way of purifying the body. While some women complain about withdrawal bleeding, others use it to avoid regular bleeding in specific situations such as journeys and sports competitions. For our ancestors, amenorrhea is likely to have been the norm, as their genital lives alternated pregnancies and breast feeding episodes.

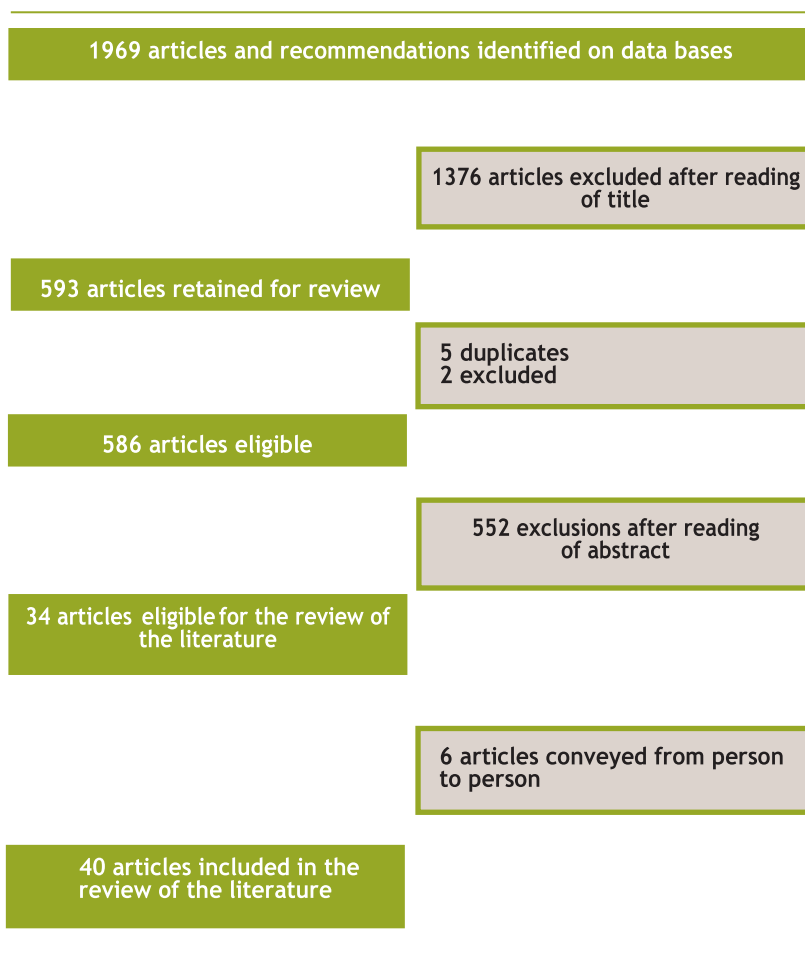


Figure - Flow diagram of the studies included in the review of the literature

Article and author (year)	Type of study	Level of evidence	Country	Population
Bénéfices et risques des différentes méthodes contraceptives. Kettani (2017)	Review of the literature	High	France	377 articles
Combination contraceptives: effects on weight. Gallo (2014)	Review of the literature	High	USA	49 studies
Combined oral contraceptives: the risk of myocardial infarction and ischemic stroke. Roach (2015)	Review of the literature	High	Holland	28 studies
Combined oral contraceptives: venous thrombosis. de Bastos (2015)	Review of the literature	High	Holland	25 studies
Endometrial cancer and oral contraceptives: an individual participant meta-analysis of 27 276 women with endometrial cancer from 36 epidemiological studies. Collaborative Group on Epidemiological Studies on Endometrial Cancer (2015)	Review of the literature	High	USA	27,276 women
Hormonal contraceptives and risk of ischemic stroke in women with migraine: a consensus statement from the European Headache Federation (EHF) and the European Society of Contraception and Reproductive Health (ESC). Sacco (2017)	Review of the literature	High	Italy	6 studies
Influence of hormonal contraceptives and the occurrence of stroke: integrative review. Lima (2017)	Review of the literature	High	Brazil	18 articles
Oral contraceptive use and kidney cancer risk among women: evidence from a meta-analysis. Liu (2014)	Review of the literature	High	China	12 articles
Progestin-only contraceptives: effects on weight. Lopez (2016)	Review of the literature	High	USA	22 studies
Treatment of vaginal bleeding irregularities induced by progestin only contraceptives. Abdel-Aleem (2013)	Review of the literature	High	Egypt	33 studies
Fiche Mémo - Contraception chez la femme à risque cardiovasculaire. HAS (2013)	Recommendations	High	France	NA
Fiche Mémo - Contraception chez l'adolescente. HAS	Recommendations	High	France	NA
Cancers in Australia in 2010 attributable to and prevented by the use of combined oral contraceptives. Jordan (2015)	Cohort study	Moderate	Australia	NA
Combined hormonal contraceptives and migraine: an update on the evidence. Calhoun (2017)	Recommendations	Moderate	USA	NA
Contraception hormonale + inducteur enzymatique : grossesses non désirées. Prescrire (2016)	Article in a review	Moderate	France	78
Étude des facteurs modificateurs du risque de cancer du sein des femmes à risque génétique élevé. Lecarpentier (2012)	Cohort study	Moderate	France	1563 patients (GENEPSO)
Conscientious objection and refusal to provide reproductive healthcare: a White Paper examining prevalence, health consequences, and policy responses. Chavkin (2013)	Review of the literature	Moderate	USA	NA
Impact of the French 3rd and 4th generation pill scare in women seeking termination of pregnancy. Caillot (2016)	Single-center study	Moderate	France	892 patients
Moins d'embolies pulmonaires et d'accidents cardiovasculaires avec les contraceptifs dosés à 20 microgrammes d'éthinylestradiol. Prescrire (2017)	Retrospective cohort study	Moderate	France	5 000 000
Mothers' attitude to the use of a combined oral contraceptive pill by their daughters for menstrual disorders or contraception. Yiu (2017)	Quantitative study	Moderate	Hong Kong	300 femmes



Article et author (year)	Type of study	Level of evidence	Country	Population
Rôle des facteurs de risque familiaux, individuels et environnementaux dans les cancers de la thyroïde : analyse d'études cas-témoins. Leux (2012)	Case control study (CATHY)	Moderate	France	332
Un outil « communicationnel » peut-il aider les médecins généralistes à mieux communiquer avec les adolescents sur la sexualité ? Perrot (2013)	Randomized interventional trial	Moderate	France	858 patients
Factors predicting mood changes in oral contraceptive pill users. Shakerinejad (2013)	Randomized cross-sectional study	Low	Iran	500 women
Influence of male decision-making and sociocultural factors in the use of contraceptive methods by women in Niger. Owoundi (2016)	Cohort study	Low	Niger	NA
Missed pills: frequency, reasons, consequences and solutions. Chabbert-Buffet (2017)	Report	Low	Europe	NA
Traditions et cultures religieuses en médecine générale. Dahan	Thesis and work	Low	France	NA
Déterminants de la pratique gynécologique des médecins généralistes. Fayolle et Vallée (2013)	Qualitative study	NA	France	15 doctors
L'implication des hommes de 18 à 50 ans dans la contraception. Étude qualitative en Rhône-Alpes. Smet et Vallée (2012)	Qualitative study	NA	France	17 men
Première demande de contraception : vision des mères qui accompagnent leur fille. Mounier et Vallée (2014)	Qualitative study	NA	France	22 mothers
Connaissances et représentations des jeunes hommes (18-20 ans) en matière de contraception. Lambourg (2015)	Qualitative study	NA	France	10 men
Accès facilité à la contraception des mineures. Prescrire (2017)	Article in a review	NA	France	NA
Choix de contraception en France : des disparités infondées. Prescrire (2013)	Article in a review	NA	France	NA
Comme si Dieu existait. Favret-Saada (2016)	Thesis	NA	France	
Contraception - L'essentiel sur les soins de premier choix. Prescrire (2017)	Article in a review	NA	France	NA
Contraception : permettre un choix optimal. Prescrire (2015)	Article in a review	NA	France	NA
Doctors have no right to refuse medical assistance in dying, abortion or contraception. Savulescu (2017)	Response to an article	NA	USA	NA
État de santé alarmant des Roms migrants en France. Prescrire (2017)	Article in a review	NA	France	NA
La contraception en France : nouveau contexte, nouvelles pratiques ? Bajos (2012)	Article in a review	NA	France	NA
La crise de la pilule en France : vers un nouveau modèle contraceptif ? Bajos (2014)	Article in a review	NA	France	NA
Migraine : prévention des crises - l'essentiel sur les soins de premier choix. Prescrire (2017)	Article de revue	NA	France	NA

Table 4 - Articles selected and levels of evidence according to the HAS criteria (articles classified by level of proof and in alphabetical order)
NA : not applicable

As regards metrorrhagia (breakthrough bleeding), it may entail daily comfort and has repercussions on sexual activities due to the “taboo” it may provoke.

The pill fattens women up!

Weight gain is a frequent blogger’s complaint: “I put on 10 kg, including 5 in one week”⁷².

On this subject, scientific findings diverge. A Cochrane review (Gallo et al., 2014) of 49 trials including 4 versus placebo or no-intervention group and a Cochrane review (Lopez et al., 2016) focusing on POP concluded that it had no effect on weight^{24,25}. However, in 2018, the review Prescrire® took note of weight gain through increased body fat with estrogen-progestin²⁶.

Moreover, there exist some divergences between pharmacovigilance data and the information found in the reliable studies considered in this review.

Among women worried over weight gain, it would undoubtedly make sense to carry out (with their collaboration) a situational analysis on the different factors that may come into play in weight gain and loss.

The pill kills desire!

Several bloggers reported that OC had an impact on sexual desire; one of them accused: “Don’t think it’s your fault if your desire abates; it’s because of that damn pill”⁷¹, while another one complained: “I was devoid of desire; though only 25, my libido had slackened. How can we accept the influence of a simple pill on our cravings?”¹⁰.

Moreover, the review Prescrire® has reported publication by the WHO of 694 notifications of libido loss imputable to OC²⁷.

That much said, no study concerning libido variations ascribable to OC has been found in the literature.

The pill begets depression!

An impact on moods was reported in the blogs: “I stopped taking the pill after having sunk into severe depression during which I felt so low as to have suicidal thoughts”¹⁰.

Adverse effects	Pre-sent	
	in netnography	In review of the literature
Metabolic effects: weight gain, obesity	YES	YES
Hormonal effects: acne, dysmenorrhea	YES	YES
Psychological effects: changing moods	YES	YES
Cardiovascular effects: migraines, maladies thromboembolic illnesses, cerebrovascular event (stroke)	YES	YES
Effects on cancers	YES	YES
Obstacles associated with medical profession	YES	YES
Ecological risk and environmental impact	YES	
Sexual effect	YES	
Risk of failure due to drug interaction		YES
Ethical and social elements		YES

Table 5 -Distribution of occurrences between netnography and review of the literature

A cross-sectional observational Iranian study of 500 women using OC reported a similar complaint from 37.7% of them²⁸. Possible thymic modifications are mentioned in OC summaries of product characteristics and user instructions²⁷. When these disturbances exist, they are undoubtedly multifactorial, with biopsychosocial components.

The pill causes migraine !

An increased number of migraines, without precision on possible presence of an aura, was often reported in the e-conversations: “I have suffered more migraines; While I know they are due to hormonal fluctuations, contraception has rendered them unmanageable”⁹. However, no participant in the e-conversations expressed concern over the increased risk of stroke associated with OC intake.

A Cochrane review concluded that OC use may increase risk of stroke in patients presenting with classical migraine, with a lower risk in those using POP³³. For Lima et al., POP use does not seem to increase risk of stroke³⁴. Calhoun recommends POP for migraine sufferers³⁵. According to Prescrire®, OC exposes the

latter to loosely specified risks, particularly of stroke, and to increased migraines^{18,36}.

The pill imperils the heart!

COC increases the risk of LDL-cholesterol hypercholesterolemia, with an OR ranging from 1.6 to 11.3 at 3 years, without mention of patient age, and the hypothesized risk is corroborated by pharmacovigilance data^{21,26}. A Cochrane review concluded that COC intake increased the risk of myocardial infarction (R = 1.6) and ischemic stroke (RR = 1.7) but no details were given concerning possibly associated risk factors³⁷.

The pill promotes embolism!

Increased risk of venous thromboembolism (VTE) due to OC seldom appeared in the e-conversations. Only two out of 746 participants reported a thromboembolic accident justifying OC cessation^{9,11}.

However, VTE is the most frequently represented AE in the literature. Prescrire and the HAS have extensively noted and commented on this risk³⁸⁻⁴¹. A Cochrane review showed that the contraceptives being studied exposed patients to VTE risk correlated to the dose of ethinyl estradiol (3 to 4 out of



10,000 COC users)⁴². The authors are in agreement on the profile of adverse effects of progestins, including increased VTE risk, especially at high doses and with third-generation progestins^{26,43}. In 2013, a retrospective study of a pharmacovigilance data base uncovered 13 deaths due to venous thromboembolic events in OC users, 12 of which involved associated risk factors. All told, 567 thromboembolic events were reported over the same time span. In 2014, the ANSM estimated that subsequent to the recommendations concerning third-generation pills, 341 hospitalizations on account of pulmonary embolism had been avoided^{44,45}.

Smoking is a major thromboembolic risk cofactor in COC users. A need to accommodate active smoking and effective contraception can lead patients to consider an alternative means of birth control (IUD, POP). Even though its association with OC is a major caregiver preoccupation, smoking failed to appear in the e-conversations.

The pill causes cancer!

Fear of OC-induced cancer seldom appeared in the netnography. That said, breast cancer was the most frequently cited cancer. One blogger mentioned as a source the book by Professor Joyeux: "The effects are numerous [...] ovarian, breast cancer, cervical cancer ... [...]. Risk of breast cancer is pronouncedly high in women having consumed the pill for 10 years"¹¹.

An increased risk of breast cancer was found by Kettani et al., with OR ranging from 1 to 1.2 among OC users (one supplementary case for 113 women). In a cohort study with a low level of evidence, Lecarpentier reported lower risk of breast cancer among women using OC but a higher risk among women having used OC⁴⁶. According to Prescrire®, in COC and POP users a heightened risk of breast cancer is incurred in 13 out of 100,000 15-to-49-year-old women per year, and in one out of 50,000 women under 35 years of age⁴⁷.

Risk of cervical cancer does not appear to be modified (OR between 0.9 and 1.9)²¹.

Conversely, some studies

have shown a reduced risk of developing other cancers. A meta-analysis concerning 27,276 women showed that for five years of COC utilization, risk of endometrial cancer decreased by 0.76 compared to women not using COC ($p < 0.0001$)⁴⁸. A meta-analysis of 24 cohort and case control studies revealed a reduced risk of ovarian cancer in women using COC and POP (OR from 0.7 to 0.8), a finding seemingly corroborated in Jordan's Australian study^{21,49}. By the same token, in a meta-analysis of 11 cohort and case control studies, a protective effect was reported concerning colorectal cancer, with an OR between 0.8 and 0.921. In a review of the literature based on two case control studies of 1327 and 744 women, Leux highlighted a reduced risk of papillary thyroid cancer in cases of OC intake (whether COC or POP), with an inverse dose-effect relationship ($p = 0.02$)⁵⁰.

In a review of the literature involving 12 studies, Liu et al. observed that OC provided protection from kidney cancer, protection that depended in duration of intake, with a relative risk of 0.89⁵¹.

According to Prescrire® (June 2018), while COC slightly increased breast cancer and cervical cancer occurrence, it lessened the risk of ovarian and endometrial cancer⁴³.

The pill pollutes!

The impact of OC on the environment was a frequent leitmotif of e-conversations. For one blogger, "It's full of hormones, it's no good for either health or the planet". For another blogger, "Hormones appear in our urine, pollute the water [...] and are responsible for the feminizing of fish"¹¹.

Little information on water pollution by oral contraceptives has been found in the literature. Prescrire® has mentioned the incomplete elimination in water treatment plants of some medicines, particularly 17-beta-estradiol and ethinyl estradiol, detected after treatment in 33% and 10% of waters respectively²⁹.

The pill weighs me down, it's a pain !

Oral contraception constraints were likened to a burden: "I

abhor the pill, but I haven't the choice"¹³, "13 years of servitude"¹¹. The risk of forgetting was a source of continual preoccupation: "I decided to stop taking the pill because too often, I would forget"¹³, "waking up in the morning in a panic, thinking I'd forgotten"¹¹.

In the literature, the risk of forgetting and the notion of constraint have been well-documented^{21,30,31}. Prescrire® nonetheless reported that in British works on clinical pharmacology, a single instance of forgetfulness did not compromise overall contraceptive effectiveness³².

Why be subjected to a medical decision?

The participants discussed their perception of their relations with the medical profession and the health care system: "I did not wish to become that type of woman, subjected to the omnipotence of physicians (the majority of whom are men)", "I've sufficiently given over my body to science and doctors"⁹, "Mistakenly dosed by my physician, the pill has ruined my health"⁹. For one participant: "The birth control pill corresponds to a second, hidden objective: money"¹¹.

In the literature, studies analyzing practices have described the difficulties of general practitioners (GP) broaching the subject of birth control/contraception. Determinants of these difficulties include: male gender, lack of training, inadequate medical equipment, the office itself, and the women's youth⁵². Perrot et al. have demonstrated the interest of a communication tool to help professionals broach sexuality to teenagers⁵³. Moreover, two studies have dealt with medical professionals' refusal to prescribe OC. In the United States, Chavkin et al. showed that this refusal was often based on religious considerations, whereas in England, Savulescu et al. deemed these refusals unjustified due to their alleged illegitimacy^{54,55}.

I cannot, I know not...

While all but nonexistent in netnography, the ethical aspects have been largely discussed in the literature. The

of religion on the decision to take or not to take OC was pointed out by Frappé et al.; while contraceptive use may be authorized for a stable couple in Catholic and Muslim tradition, in orthodox Judaism it is forbidden without rabbinical permission⁵⁶. In her article, Favret-Saada dwelt on the prohibition of “chemical contraception” by the Catholic church since the 1968 *Humanae Vitæ* encyclical⁵⁷.

According to Prescrire®, there exist social disparities in OC utilization^{58,59}. Middle or lower class women consult a gynecologist more rarely and are less informed on contraception. Bajos et al. have shown that women without degrees show more wariness about oral contraception⁶⁰.

The mediatized 2012-2013 controversies about the third and fourth-generation pills were cited one time in the netnography: “I had to change pills due to the issues with 3rd-generation pills”¹⁰. Caillot et al. showed that mediatization of the adverse effects of CO led to modification of the profile of OC users. Students, unemployed women and single women most often switched from the pill to the IUD ... or stopped using medicalized contraception⁶¹.

Several articles have emphasized the importance of other person's regards and the ways in which of men may represent obstacles to OC use. Owoundi showed that in Niger, neither men nor women wished to utilize contraceptives⁶². While Lambourg pointed out the centrality of the woman's place in contraception, Smet et al. showed that some men wish to be more closely involved^{63,64}. Fearing unrestrained sexual activity, in Hong Kong, mothers were reluctant to accept OC use by their daughters^{65,66}.

DISCUSSION

Strengths and limitations

The originality of this study resides in a comparison of netnography data with those obtained through a review of the literature, taking pharmacovigilance findings into close account. As for its limitations, article selection for the literature review and data extraction for the study were carried out by a single investigator.

As regards netnography, the

fact that it was carried out after the 2012-2013 mediatized controversies surely had some influence on the results inasmuch as the use of contraceptives in France fluctuated following that period³. In addition, while the ages of the blog participants remain unknown, the ages of the bloggers range from 25 to 33, which limits extrapolation to a population of women liable to use OC. There also existed a selection bias, given that in each of the e-conversations, when a blogger emphasized a fear of hers, it was likely to reappear in the following commentaries. No fear of the possible impact of UC on fecundity was mentioned, nor were ethical and religious aspects frequently brought to notice; this may have been due to the limited number of e-conversations included.

Adverse effects and long-term treatment

Even though esthetic consequences are apparently of lesser medical importance, they represented the fears most frequently highlighted by the women. The importance attributed to the risks of acne and weight gain reflected the importance given in our society to body image. As regards lessened sexual desire, the anonymity of e-conversation may have favored evocation of the subject.

Even though they are widely documented in the literature, neoplastic and cardiovascular risks seemed less preoccupying to the bloggers, but we cannot know whether they were included in fears related to “hormones”; the subject rather obviously calls for further exploration.

It bears mentioning that the most elevated OC-related thromboembolic risk (third-generation pills) remains markedly inferior to pregnancy-related thromboembolic risk (8 versus 29.4/100 000 women); it consequently is not a frequent subject of women's conversation⁶⁷.

Tran et al. took up the notion of “treatment burden” mentioned in our study of OC; the pill has got to be taken every day, and the risk of forgetting is undeniable⁶⁸. Different authors have shown that difficulties in compliance, which are estimat-

ed at 50%, were a major failure factor in chronic treatment⁶⁹.

As regards forgetting, Marie et al. showed that 54% of women had forgotten to take the pill at least once over the previous three months and underlined frequent ignorance of how to proceed following an instance of forgetfulness⁷⁰. Some studies have reported under-utilization of post-intercourse (emergency) contraception⁷¹. Given that intra-uterine or subcutaneous contraception eliminates this risk and possible cause for concern, information on this subject should constantly be provided.

Men could share medical contraception responsibilities with women⁶⁴. Some of them would be ready to do so were contraception to be reversible, but the women questioned on the subject feared that their partners might forget and would consequently bear the burden of subsequent pregnancy⁷². However, male contraception leaves room for improvement, especially inasmuch as vasectomy is seldom practiced in France⁷³.

Informed contraceptive choice In 2013, absence of contraception was the main cause of recourse to voluntary termination of pregnancy^{3,74,75}. The wish to plan pregnancies via OC is counterbalanced by the fear of adverse effects and of the burden the pill may represent.

The 2012-2013 controversy on third and fourth-generation pills seems to have had an impact on contraceptive choice, with reduced oral contraception in 2014³¹.

An investigation by Vallée et al. showed that while patients consulting their GPs are generally well-informed about the AEs associated with OC, less extensive knowledge is connected with low level of studies, low socio-professional category, advanced age, male sex and appreciable treatment duration⁷⁶. For women of childbearing age, particularly those with a low economic level, it would appear primordial, in view of presenting them with an informed contraceptive choice, to possess responses to the different fears having been voiced. While the internet site of Santé publique France, choisirsacontraception.fr, is of some avail to women and professionals, its



reliability and updating procedures are less than perfect⁷⁷.

Even though sex education in French school settings has been compulsory since 2001, and in spite of the fact that OC for minors is free of charge, girls under 18 years of age seem to be inadequately informed on birth control⁷⁸. A qualitative study has shown that more systematic educational programs in schools could ensure improved information⁷⁹. It also bears mentioning that GPs, who initiate contraception in 45% of cases and have it renewed in 58%, are at times the first persons to broach the subject with women⁸⁰.

Among the alternatives proposed in the blogs, the copper IUD is apparently the most widely appreciated method, followed by the condom and non-hormonal procedures⁶⁰.

Some women have proposed more "natural" methods by taking their temperature with or without fertility monitor or

evaluating the thickness of their cervical mucus. These methods present a Pearl index reading (25) markedly higher than those of the male condom (15), the copper IUD (0.8), the hormonal IUD (0.2) ... and OC (9)⁷.

Distrust towards medicalized contraception can be considered as a form of contraceptive hesitation, in some ways comparable to vaccine hesitancy insofar as the two hesitations pertain to generally effective treatment; that said, a collective dimension is proper to considerations on vaccination.

CONCLUSION

This study has shown that while women's fears tended to overlap with scientifically validated data, the most reversible and least adverse events, as well as the burden of treatment, are frequently highlighted by female bloggers.

It could be interesting to explore, amongst women of

childbearing age not desiring long-term contraception, the impact of their age, religious beliefs and socio-economic level on the statistical distribution of fears regarding oral contraception.

In order to facilitate informed choice and reduce the risk of unwanted pregnancy, as a means of measuring the reliability of currently applicable contraception techniques the Pearl index should be routinely presented to women and couples. Fair-minded and comprehensive information on the potentially adverse effects of long-term contraception, particularly the pill, should be provided not only by medical professionals, but also by the mass media and in school settings. The information should take into full account the fears expressed by female users in view of effectively tailoring their contraception ... and countering the dissemination of falsehoods.

Summary

Introduction: Oral contraceptives is the most used contraception method in France. However, there's a recent decline of pill's use, mainly among young women.

Objectives: This work aims to compare women's beliefs about oral contraception to adverse effects described in the literature.

Methods: A review was conducted on literature published from January 2013 to April 2018 on Medline, Cochrane Library, HAL, Prescrire and Exercer with the keywords "contraception and refusal" and « contraceptives and oral », in the same time as, netnography on 5 blogs with the keywords "blog stop pill".

Results: bloggers' main fears were acne, dysmenorrhea, amenorrhea, weight gain, decreased libido, psychological and environmental effects. In comparison to literature, fears about thromboembolic, cardiovascular and neoplastic risk, although more serious, were fewer found. The feeling of treatment's burden was present (daily intake and risk of forgetting).

Conclusion: Women's fears overlap with scientific data. Healthcare professionals must continue to provide complete information in order to address these genuine fears and support informed and shared decision.

Keywords: oral hormonal contraceptives; received idea; adverse effects.

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