Awareness of the effects of postponing motherhood among hospital gynecologists: is their knowledge sufficient to offer appropriate help to patients?

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Abstract

Purpose The aim of this study is to ascertain the awareness of hospital gynecologists about the effects of woman's age on spontaneous fecundity and on the efficacy of assisted reproduction techniques (ARTs).

Methods One hundred fifty-six gynecologists working in public or private Italian hospitals, without specific experience in reproductive medicine and ART, were administered a multiple-choice answer questionnaire addressing (a) the effect of age on woman's spontaneous fecundity, (b) the tools to estimate the ovarian follicular reserve, and (c) the outcome of ART in women above 40 years.

Results Approximately half of the interviewed gynecologists indicated the woman's age limit for successful reproduction between 44 and 50 years; fertility lifespan was believed to be prolonged by oral contraception, pro-fertility medical treatments, or ART. The correct meaning of serum FSH measurement was known by approximately one third of the interviewed doctors. The effectiveness of ART for women of advanced age was overestimated by half of the gynecologists, especially in case of patients having regular cycles and/or small follicles at ultrasound.

Conclusions Overall, the survey clearly showed that the knowledge of hospital gynecologists about the effects of age on woman's fertility and ART effectiveness is largely insufficient to offer scientifically correct, helpful information to patients. Properly targeted corrections to academic and periodical educational programs for Ob/Gyn specialists are warranted.

Keywords Age · Fertility · Fertility awareness · Assisted reproduction techniques · Gynecologist

Introduction

Gynecologists working in the area of reproductive medicine and assisted reproduction technique (ART) face every day the detrimental effect of age on women's spontaneous fecundity and on the outcome of infertility treatments. Age progressively reduces the ovarian reserve of follicles and oocytes, increasing at the same time the prevalence of genetic damage in oocytes and finally worsening their competence to develop into a successful pregnancy [1, 2].

More and more women living in the developed countries delay motherhood for variable reasons: postponing pregnancy is sometimes a necessity, due to unstable socioeconomic or personal conditions that force to wait before starting a family project. Sometimes postponing pregnancy is a choice, aimed at devoting energy and time to develop the career and to perceive self-realization. Regardless the motivation at its basis, childbearing postponement at older ages has significant consequences on a woman's fecundity, of which women are often unaware [3, 4]. The lack of knowledge and of consciousness about the detrimental consequences of late

Capsule A relevant proportion of hospital gynecologists have poorer knowledge on fertility than required to properly advise patients

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motherhood is continuously fed by misleading messages diffused by information media, who exalt an archetype of woman who thinks about maternity after having solved more urgent issues. This non-scientific misinformation reassures women about the possibility of easily becoming mother after age 40 and highlights the effectiveness of ART, presenting it as a panacea for all problems. When women in the fifth decade experience couple's infertility, start a therapeutic workout, and face the problems linked to their age, they often complain of having received insufficient or misleading information and scarce (if any) warning about the limited chance of spontaneous or ART-assisted conception in advanced age, when the ovarian reserve and the oocyte quality become critical [5].

Who should be in charge of giving scientifically correct information on reproductive life span to young women, helping them to plan their future family life? Who should offer to women who at present cannot have a pregnancy at least the option of freezing oocytes to preserve a better chance of future motherhood [6–8]? It is quite obvious that the scientific community, and especially doctors specialized in gynecology, should be very active in meeting the need of knowledge on human fertility [9]. Is the average gynecologist competent enough on human fertility to fulfill this need? In order to clarify this issue, we administered to hospital gynecologists without a specific experience in the field of reproductive medicine a short questionnaire (Appendix) aimed at evaluating the level of knowledge about human fertility, with special reference to the effect of the woman's age.

Materials and methods

Studied doctors

Gynecologists of both sexes working in eight public and two private hospitals in Northwest Italy (Piedmont area) were recruited during their routine clinical activity and asked to immediately answer to a questionnaire. This observational research was approved by the local ethical committee, and the informed consent was obtained from all recruited doctors.

The criteria used to include doctors in the survey were the following: (a) have obtained the degree in medicine and the specialization in obstetrics and gynecology in Italy and (b) have been working as gynecologists in public or private hospitals during at least the last 2 years. Exclusion criteria were as follows: (a) have been working in public or private reproductive medicine and/or ART units and (b) have attended to any sub-specialization course in reproductive medicine and/or ART in the last 5 years.

One hundred ninety-four gynecologists were selected to join the study during a 10-month time period (February–October 2014); 22 were excluded as fulfilling one or both the exclusion criteria; 172 matched the inclusion criteria, but 16 of them refused to participate in the study; finally, 156 were actually enrolled and received the questionnaire.

The median age of the participants was 47.5 years (range 28–61), and the median time after getting specialization in Ob/Gyn was 18.2 years (range 2–34). The main experience areas of the interviewed physicians were obstetrics (46 %), gynecological oncology (23 %), urogynecology (10 %), gynecological surgery (10 %), and no specific interest or multiple areas of interest (21 %). As requested by the inclusion criteria, none of them had reproduction as the main interest.

Questionnaire

The questionnaire (Appendix) was composed of seven multiple-choice answer questions addressing the following issues: (a) the effect of age on woman's spontaneous fecundity, (b) the available tools to estimate the ovarian follicular reserve, and (c) the outcome of ART in women above 40 years. All questions had four options of answer, among which only one was correct.

An envelope containing the questionnaire was administered by a clinical psychologist who asked the doctors to immediately answer (written answers) the questions and controlled that they could not have any contact with sources of medical information (e.g., colleagues, books, and websites) during the questionnaire compilation. The questionnaire was anonymously filled in, the only requested personal information being age, year of degree, and of specialization.

Results

Overall, the answers to the questionnaire (Appendix) can be summarized as follows: (a) more than half of the gynecologists (56 %) judged “not rare” the possibility of conceiving, avoiding spontaneous abortion, and finally have a baby even after age 44, between 44 and 50 years (question 1); (b) 49 % of them answered that the prolonged assumption of oral contraceptives, and the administration of ovarian-stimulating hormones or the use of in vitro fertilization (IVF) technique may postpone the female age fecundity limit (question 2); (c) most gynecologists (80 %) were aware that the ovarian reserve of follicles may be estimated by measuring the serum follicle-stimulating hormone (FSH) in the early follicular phase, but only 44 % of them answered that estradiol should be contemporaneously measured to get a reliable FSH level, avoiding the artifact due to the negative feedback of high estradiol levels over the pituitary (questions 3 and 4); (d) the serum FSH threshold above which a successful pregnancy

rarely occurs was correctly indicated by 35 % of the interviewed subjects at 20 IU/l, whereas the others considered not rare to have a successful pregnancy also with higher circulating FSH levels (question 5); and (e) 51 % of the interviewed gynecologists considered some clinical features (regular menstrual cycles, spontaneous ovulation, follicles seen at transvaginal ultrasound) as factors able to improve the chance of spontaneous conception even with circulating FSH >20 IU/l (question 6), and 46 % of them answered that the ART outcome of women having high basal FSH may be improved if FSH levels decrease either spontaneously or after oral contraceptive administration (question 7).

Discussion

It is well known that women's fecundity decreases gradually but significantly with chronological age and that the decline accelerates after 35 years [10]. Chronological age, however, not always corresponds to biological age (read "ovarian" age) that may be rather precisely estimated (more precisely than looking at chronological age only), studying the ovarian follicular reserve by means of hormonal (anti-müllerian hormone, basal FSH, etc.) [11, 12] and ultrasonographic tests [13].

Indeed, conceiving and having a successful pregnancy is rare for a Caucasian woman after age 44 [1], even if she still has regular menstrual cycles or some follicles may be seen in her ovaries at transvaginal US [2]. This age limit is linked to the physiological, continuous consumption of follicles that progressively decreases the ovarian reserve and to the progressively increasing oocyte aneuploidy rate [14, 15]; unfortunately, the limit cannot be avoided, delayed, or restored using hormonal contraception or other treatments.

A continuous, progressive trend toward performing IVF treatments to counteract age-related infertility has been observed in the last decades, and which therapeutic tools may be able to induce the ovaries of women of advanced age to produce good quality eggs is one of the most studied issues [16]. Unfortunately, very likely the effects of ovarian aging cannot be effectively counteracted by hormonal ovarian stimulation and ART, as also the outcome of the most advanced in vitro techniques is significantly worsened by a poor ovarian responsiveness [17] and a poor oocyte quality [18]. An interesting simulation model of spontaneous fecundity showed that in order to have a 90 % chance of building up a family, a couple should start no later than at a woman's age of 32 to get one child, at 27 years for two children, and at 23 years for three children [19]. Considering the recent IVF success rates, these age limits become 35, 31, and 28 years, respectively, whereas postponing conception would mean accepting a significantly lower chance of family completion [19].

Postponing parenthood is probably the most important cause of infertility across the developed world nowadays, the woman's age being linked to a higher rate of involuntary childlessness as well as to an increased risk of complications in pregnancy, fetal defects, and neonatal morbidity [20]. Increasing public awareness of the impact of advanced age, and particularly of woman's age, on fertility is essential for people to take well-informed decisions on when to have children. Unfortunately, this topic—and the physiology of human reproduction in general—is poorly known by the majority of people, who receive insufficient sexual education during childhood, have almost no information about family planning at school, and do not find reliable sources of information in the Web or in the media [4, 21, 22].

Surprisingly, human reproduction physiopathology as well as the diagnostic and therapeutic tools currently available to cure infertility are superficially treated also during the 6-year university course leading to the degree in medicine, and not only in Italy. A survey on fertility knowledge among Italian university students [23] showed, in fact, that they had just vague concepts about reproduction, not more accurate than those of students attending to other university courses (e.g., humanistic sciences). Interestingly enough, similar results were reported in other countries like Israel [24], Finland [25], the USA [26], Austria [27], France [28], and New Zealand [29], although in some studies [27], medical students showed a better knowledge than other students on this specific subject.

Complex cultural, social, political, and generational reasons contribute to determine the choice to delay motherhood made by many women living in developed countries; this trend, in some cases, may also be due to important social and economical problems involving young couples. It cannot be denied, however, that the model of a woman devoted to career, who defers motherhood after 40s, is strongly supported by the pseudo-scientific information offered by mass media that contribute to generate the idea that the effects of time may be overcome by technology (read "ART"), and motherhood in the fifth decade will be fairly easy to obtain. Indeed, there is a strong unmet need of scientifically correct information on human fertility. Unfortunately, attempts to organize an online educational intervention resulted in small improvements of fertility awareness, not sustained over time [30]; also, the role of general practitioners in spreading the right information is still largely undefined [31].

Doctors with a specialization in obstetrics and gynecology appear to be a logical option to deliver scientifically correct information on human fecundity, an alternative to the misleading information given by media. Most women undergo a gynecological consultation at young ages, and the gynecologist has the chance to help them to properly schedule their reproductive life, increasing their awareness of the natural rules regulating human fecundity. Unfortunately, the present survey

shows that a relevant proportion of the gynecologists that work in public or private hospitals in our geographical area (those who are supposed to follow continuous medical education programs) possess just an approximate knowledge of human fertility, including some incorrect beliefs.

It must be considered that the median age of the participants in the present survey was rather high and the median time after getting specialization in Ob/Gyn was considerably long: their culture could not precisely reflect the one of younger specialists who may have been trained with newer curricula but reflect the true situation in Italy, where getting a stable job in a hospital is quite difficult and usually happens several years after obtaining the Ob/Gyn specialization. It must also be considered that, practically, all Italian hospital gynecologists have also their own office private practice (inside or outside the hospital), and what happens daily is that every gynecologist receives all kinds of patients. It is not unlikely, therefore, that an infertile couple gets the first consultation from a gynecologist who is expert, e.g., in obstetrics or urogynecology; then, it may happen (or not) that he/she gives just an initial opinion and then sends the couple to colleagues specialized in reproduction for further diagnosis and treatment. This first opinion was our main interest in the present study.

In general, the interviewed gynecologists, none of whom had been working specifically in the field of reproductive medicine, showed to overestimate both the spontaneous fecundity and the efficacy of infertility treatments at advanced age. Approximately half of them were not aware of the woman's age limit for successful reproduction and were convinced that it could be postponed using medical treatments or IVF. Even if most of the interviewed physicians knew that the measurement of circulating FSH in the early follicular phase is an effective tool to estimate the ovarian reserve, only a few knew the proper meaning of FSH level [32] and were biased toward a wrongly optimistic picture. This is rather worrying, especially considering that it is quite a common observation that gynecologists who lack culture about infertility are more prone to suggest useless therapies (e.g., surgical interventions) that may imply a further loss of time and worsen the prognosis of infertile couples.

The present survey clearly shows that the level of knowledge about the effects of age on woman's fecundity among hospital gynecologists in our geographic area is largely insufficient to offer scientifically correct, helpful information to patients. Since this is the first survey investigating the average gynecologists' culture on human fertility, we do not know if its results may be referred just to the local situation or may reflect also what happening in the whole Italy and/or in other countries. Nevertheless, they clearly suggest that targeted corrections of academic and periodical educational programs are an absolute need. The future of fertility health care must be centered on providing people with information leading to informed choice about all aspects of their own fertility health.

Appendix

Questionnaire

Question 1

Until which age it is *not rare* to conceive, skip spontaneous miscarriage, and give birth for Caucasian white women?

	Percentage of interviewed subjects giving the answer
44 years*	44
46 years	26
48 years	13
50 years	17

Question 2

Can the age threshold until which it is *not rare* to conceive, skip spontaneous miscarriage, and give birth be postponed by 3–4 years using one of the following medical treatments?

	Percentage of interviewed subjects giving the answer
Use of hormones to stimulate ovulation	14
Use of in vitro fertilization (IVF)	23
Use of oral contraceptives (OCs) for at least 8 years	12
There is no treatment able to postpone the age threshold*	51

Question 3

In order to estimate the ovarian reserve of follicles and oocytes, which of the following measurements on the blood are needed?

	Percentage of interviewed subjects giving the answer
Follicle-stimulating hormone (FSH) alone	40
FSH and luteinising hormone (LH)	7
FSH and estradiol*	44
FSH and progesterone	9

Question 4

To be a reliable indicator of the ovarian reserve of follicles and oocytes, must circulating FSH be measured at a specific time of the menstrual cycle?

	Percentage of interviewed subjects giving the answer
Between days 8 and 14	15
Between days 14 and 21	2
Between days 2 and 5*	80
	3

Any day of the menstrual cycle is appropriate

Question 5

Which is the circulating FSH threshold above which *it is rare* to conceive, skip spontaneous miscarriage, and give birth?

	Percentage of interviewed subjects giving the answer
20 IU/l*	35
30 IU/l	20
40 IU/l	19
50 IU/l	26

Question 6

When circulating FSH is above the threshold (see question 5), are there situations in which the chance to conceive, skip spontaneous miscarriage, and give birth significantly improves?

	Percentage of interviewed subjects giving the answer
When menstrual cycles are regular (26–33 days)	18
When ovulation is regularly maintained	20
When ovarian follicles may be observed at transvaginal ultrasound	13
None of the abovementioned situations significantly improve the chance to conceive*	49

Question 7

When circulating FSH is above the threshold (see question 5), does ART still offer good outcome if one of the following conditions is present?

	Percentage of interviewed subjects giving the answer
If circulating FSH decreases after oral contraceptive administration	9
If FSH spontaneously decreases within 2 months	15
If menstrual cycles are regular (26–33 days) and follicles are seen at transvaginal ultrasound	22
None of the abovementioned situations offer the chance of a good ART outcome*	54

The correct answer is marked with an asterisk.

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