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ARTICLE

Poor knowledge of age-related fertility decline and assisted reproduction among healthcare professionals

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Abstract Reproduction is a matter of concern for individuals and society due to the postponement of childbearing, and healthcare professionals are the main source of information and counselling. This study aims to evaluate how knowledgeable healthcare professionals are about fertility and assisted reproduction, and to explore attitudes towards social oocyte freezing. A cross-sectional study was performed with 201 professionals (gynaecologists, physicians and nurses) from four public centres in Spain. Participants completed a survey about fertility, IVF, oocyte donation (OD) and social oocyte freezing, between May 2013 and March 2014. Reported mean age limits for pregnancy were 39.5 ± 4.5 (spontaneously), 43.7 ± 5.2 (IVF) and 49.0 ± 6.5 (OD). Gynaecologists reported a younger limit for spontaneous and IVF pregnancies ($P < 0.001$); 36.1% reported a limit for a spontaneous pregnancy >39, compared with 77.3% of other physicians and 72.9% of nurses. Regarding social oocyte freezing, 41.8% of gynaecologists thought it should be offered to every young woman, versus 62.7% of other physicians and 48.9% of nurses ($P = 0.041$). In conclusion, gynaecologists are more knowledgeable about fertility and assisted reproduction, while more restrictive towards social oocyte freezing. Knowledge and attitudes could influence the quality of information and counselling given to patients.

KEYWORDS: age-related infertility, assisted reproduction, fertility knowledge, motherhood, social oocyte freezing

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Introduction

Difficulties in achieving pregnancy naturally are becoming more common, given the contemporary tendency to postpone childbearing to later in life (Schmidt et al, 2012). Reproduction at older ages is becoming a matter of concern for individuals (Hvidman et al., 2015); healthcare professionals should be competent to deal with this issue by having an accurate knowledge about both age-related fertility decline and the options currently available to mitigate infertility risk, such as social oocyte freezing.

Reproduction, including but not limited to family planning, preconception care, infertility and assisted reproductive technologies, is a topic usually discussed with healthcare professionals, who are the preferred source of medical information regarding fertility among the general population, more so even than the rising reliance upon the internet and mass-media resources (Lundsberg et al., 2014; McCree et al., 2006; Nagler et al., 2010; Teixeira et al., 2014). Therefore, healthcare professionals play a clear role in providing health information and reproductive counselling to both patients and the general population. However, reproductive knowledge has been shown to be lower than desirable in university populations, including medical students (Bretherick et al., 2010; Chan et al., 2015; Hashiloni-Dolev et al., 2011; Nouri et al., 2014; Rovei et al., 2010; Sedlecky et al., 2011) and obstetrics and gynaecology residents (Yu et al., 2016), as well as in female healthcare professionals such as nurses, midwives and medical doctors (Mortensen et al., 2012). Moreover, the study by Bonetti *et al*. revealed a low perception among assisted reproductive technology professionals of their own infertility risk, despite having in-depth knowledge of human fertility and infertility treatments (Bonetti et al., 2008).

Overall, healthcare professionals are aware that age-related infertility exists, but are not able to pinpoint when fertility starts to decline and overestimate the chances of achieving a pregnancy (either naturally or through assisted reproductive technologies). In the study by Yu et al. (2016), most of the gynaecology residents surveyed agreed that age-related fertility decline needs to be discussed during the well woman annual examination. Conversely, informing women about social oocyte freezing as an option to maintain the quality of oocytes at a younger age is still controversial. Although oocyte vitrification is an efficient option for elective fertility preservation in women in their early thirties (Cobo et al., 2016; Stoop et al., 2014), there is disagreement among professionals about the application of oocyte vitrification to postpone motherhood for other than medical reasons (von Wolff et al., 2015; Yu et al., 2016).

The objective of the present study is to evaluate knowledge about age-related female fertility decline and the comprehension of assisted reproductive technology possibilities and limitations in healthcare professionals outside of assisted reproductive technologies, and to explore the attitudes of these said professionals towards social oocyte freezing.

Materials and methods

Study population

This was a cross-sectional study carried out between May 2013 and March 2014. The study questionnaires were filled in anonymously by 201 healthcare professionals in four public primary care centres in Barcelona, Spain, in the context of a lecture about fertility, assisted reproductive technologies and social oocyte freezing, independently scheduled for each centre. Participation in both lecture and survey were voluntary. The surveys were collected before the lecture started. The study did not require ethical committee approval.

Survey

The survey included the socio-demographic characteristics of the participants and questions measuring participants' knowledge of age-related infertility and assisted reproductive technologies, and their attitudes towards social oocyte freezing. The seven questions considered for this study were: Q1. Up to what age could a woman get pregnant easily and spontaneously? Q2. Up to what age could a woman get pregnant through assisted reproductive technologies using her own oocytes? Q3. Up to what age could a woman get pregnant through assisted reproductive technologies using donor oocytes? Q4. Should social oocyte freezing be offered to all young women? Q5. From which age should social oocyte freezing be offered? Q6. Up to what age should social oocyte freezing be offered? Q7. Should social oocyte freezing be financed by the public health system? The questions were open-ended, and so because of this, in order to evaluate fertility knowledge differences between groups, we established a cut-off for correct answers to each question (considering as correct a reported age $\leq$ cut-off, and as incorrect $>$ cut-off), based on the literature and current common practice in Spain: 39 years for a spontaneous pregnancy, 45 years for a pregnancy through IVF and 50 years for a pregnancy through oocyte donation (OD) (American College of Obstetricians and Gynecologists Committee on Gynecologic Practice, 2014; Baird *et al*, 2005; Dunson et al., 2004; Ethics Committee of the American Society for Reproductive Medicine, 2013; Gleicher et al., 2014; Leridon, 2004; Practice Committee of the American Society for Reproductive Medicine, 2006). It is worth noting that we chose the cut-off of 39 years for a spontaneous pregnancy because it is known there is a marked decrease in women's fertility starting from their mid-30s, but it remains difficult to establish an unequivocal cut-off between 35 and 39 years (Dunson et al., 2004; Leridon, 2004).

Statistical analysis

Differences between professional categories were tested by ANOVA and chi-squared tests. Furthermore, the effect of the healthcare category on the percentage of correct answers to each question was modelled by logistic regression, controlled for age, gender, parity, working and relationship status. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS, version 22, IBM Corp., USA). A *P*-value of <0.05 was set as statistically significant.

Results

Demographic characteristics

The 201 healthcare professionals were classified into three professional categories: gynaecologists ($n = 72$), physicians

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