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## ARTICLE

# Women's intentions to use fertility preservation to prevent age-related fertility decline


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**Abstract** The optimal age to cryopreserve oocytes for later use is before 36 years. Current users are on average 38 years old. In this cross-sectional study an online survey was constructed about the factors associated with the intentions of childless women aged 28–35 years to use fertility preservation (FP). Questions were derived from the Theory of Planned Behaviour (attitudes and subjective norms regarding FP and perceived behaviour control to do FP) and the Health Belief Model (perceived susceptibility of infertility, perceived severity of childlessness, barriers and benefits of FP and cue to use FP). Also addressed were parenthood goals, fertility knowledge and intentions to use FP within 2 years. The data were analysed using structural equation modelling. The Health Belief Model showed a good fit to the data ( $\chi^2 [14, n = 257] = 13.63, P = 0.477; CFI = 1.000; RMSEA = .00, 90\% CI [0.00-0.06]$ ). Higher intentions to use FP were associated with feeling susceptible to infertility, considering FP useful to achieve parenthood, perceiving the implications of infertility as severe, expecting to have children at a later age and having fewer ethical concerns. This suggests an increase of fertility awareness is necessary for the optimal use of FP. 

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**KEYWORDS:** cryopreservation, fertility, health behaviour, oocytes, psychology

## Introduction

Recent European data show that women are changing their reproductive behaviour and postponing childbearing (Mills

et al., 2011). This has important implications for their fertility status (Dunson et al., 2004). People tend to believe that assisted reproductive techniques will help them to conceive at a later age (Lampic et al., 2006), but research has shown

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that assisted reproductive techniques can only partially compensate for the fertility decline (Leridon, 2004). Therefore, postponing childbearing is linked to a higher rate of involuntary childlessness and smaller families (Schmidt et al., 2012).

One available option to prevent age-related fertility decline is fertility preservation (FP) via oocyte cryopreservation. This technique allows women to retrieve and cryopreserve oocytes for later use, as an extra possible option to reach parenthood. Financial costs are around £6000 for the oocyte retrieval and £300 per year for storage. However, ovarian ageing causes a decrease in the number and quality of oocytes (Broekmans et al., 2007) and results from a recent meta-analysis suggest that the optimal age to cryopreserve oocytes is before 36 years. This meta-analysis concluded that cryopreservation of oocytes before 36 years had the highest discrimination capability for success versus failure, with an area under the curve (AUC) of 0.72 (Cil et al., 2013). However, studies conducted in Belgium and the US suggest that the average age at which women are currently cryopreserving their oocytes is 38 years (Gold et al., 2006; Mertes et al., 2012; Nekkebroeck et al., 2010). In a survey among 183 patients who did at least one cryopreservation cycle (84% older than 35), 79% indicated that they wished they had undergone FP earlier. Of the women who did an FP cycle, 53% felt more secure about their reproductive future than those who did not cryopreserve their oocytes (Hodes-Wertz et al., 2013). These data suggest that if women are aware of the impact of age on fertility potential they may choose to act sooner to preserve their fertility than they are currently acting.

Several researchers have investigated women's motivations to use FP. The most commonly cited reasons have been the pressure of the biological clock, taking off the time pressure to find the right partner and giving a future relationship more time to develop before parenthood is discussed (Gold et al., 2006; Nekkebroeck et al., 2010). This body of research also showed that a large group of women considered

using FP. Two different large surveys ( $n > 1000$ ) with women aged between 20 and 50 indicated that around 31.5% (Stoop et al., 2011) and 34.5% (Daniluk and Koert, 2012) of women considered using FP. In another survey with 234 childless women aged 34 years and older, 46% considered cryopreserving their oocytes (Proodfout et al., 2009). These data indicate a potential demand for FP, but this need is not fully realised. Indeed, of the women who inquire about FP treatment by phone (call centre at Extend Fertility, Boston, USA), only 4% go on to use the technique; and those that do tend to do so at a less than optimal age (i.e.  $37.2 \pm 2.3$  years of age; Sage et al., 2008).

To optimize the appropriate use of FP the factors that predict women's intentions to use it at an optimal age (i.e. under 36 years) should be identified. The paradox is that women cannot be expected to consider using FP before they consider parenthood in general. On average women in Organisation for Economic Co-operation and Development (OECD) countries have their first child at the age of 28.2 (OECD, 2015). Because social norms influence fertility behaviour (Bernardi, 2003; Mills et al., 2011), it can be expected that childless women will start considering parenthood at about this age. These women are entering the age range when fertility starts to decline, but this decline is not yet too accentuated to prevent the use of FP. As the optimal age to cryopreserve oocytes is before 36 years (Cil et al., 2013), women in the age range 28–35 years are the most suitable candidates for FP. A better understanding of these women's FP knowledge, their views on FP and their intentions to use it may identify motivating factors to inform educational strategies to optimize the use of FP techniques.

Two extensively validated psychological theories are useful to understand women's intentions to use FP: the Theory of Planned Behaviour (TPB) and the Health Belief Model (HBM). A schematic representation of the TPB is presented in Figure 1 (Ajzen and Koblas, 2013). The TPB proposes that individuals will have stronger intentions and be more likely to perform

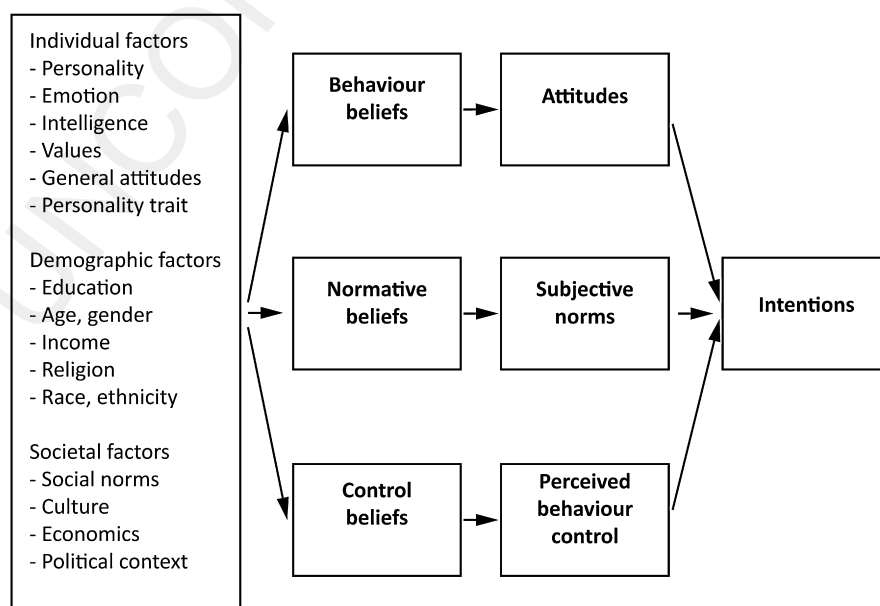


Figure 1 Theory of Planned Behaviour (adapted from Ajzen and Koblas, 2013).

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