



[www.sciencedirect.com](http://www.sciencedirect.com)  
[www.rbmsociety.com](http://www.rbmsociety.com)



ORIGINAL ARTICLE

# Parenthood aspirations and understanding of factors that affect the chance of achieving them: A population survey

Karin Hammarberg<sup>a,b,\*</sup>, Renee de Silva<sup>a</sup>

<sup>a</sup> Victorian Assisted Reproductive Treatment Authority, Melbourne, Australia; <sup>b</sup> School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

\* Corresponding author at: Victorian Assisted Reproductive Treatment Authority, Melbourne, Australia. E-mail address: [Karin.hammarberg@monash.edu](mailto:K.Hammarberg@monash.edu) (K. Hammarberg).



**Karin Hammarberg** RN, BSc, PhD is Senior Research Officer at the Victorian Assisted Reproductive Treatment Authority and Senior Research Fellow at the School of Public Health and Preventive Medicine at Monash University (Australia).

**Abstract** Most women and men want and expect to have children. Parental age and some health behaviours affect fertility and the chance of conception. The aim of this study was to gauge people's parenthood aspirations and knowledge about the factors that affect their chance of achieving them. Members of an Australian probability-based online panel aged 18–45 years were invited to complete a survey with questions about parenthood goals and knowledge about factors known to affect fertility. Of the 965 eligible people, 716 (74.2%) completed the survey. Only 6% stated that they did not want biological children. Around one in 10 respondents had experienced infertility. Amongst respondents aged 35–45 years, almost one in five (18%) had experienced infertility. Overall, respondents reported high levels of confidence about their understanding of preventative measures associated with safe sex and avoiding unwanted pregnancies. However, confidence in understanding of factors affecting ability to conceive was lower. Almost one-third of respondents believed that female fertility starts to decline between the ages of 35 and 39 years, and another one-third of respondents believed that the decline starts at 40 years of age or later. One in four respondents believed that male fertility starts to decline at 50 years of age or later. Findings suggest that people of reproductive age in Australia have inadequate knowledge about the factors that affect the chance of achieving their parenthood goals. Fertility health education initiatives are needed to allow people to make informed decisions about childbearing, and reduce the risk of unfulfilled parenthood aspirations.



© 2021 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

**KEYWORDS:** Parenthood, Family formation, Fertility, Fertility knowledge

<https://doi.org/10.1016/j.rbms.2021.11.006>

2405-6618 / © 2021 The Author(s). Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

Total fertility rates (i.e. the average number of children born per woman over a lifetime) are falling globally (Wang et al., 2020). In most Organisation for Economic Co-operation and Development (OECD) countries, the total fertility rate is now between 1.4 and 1.9 children per woman, which is well below the value of 2.1 needed for population replacement (OECD Family Database, 2016). One of the reasons for lower fertility rates in high-income countries is that age at first birth has increased significantly since the 1970s as a result of individual and structural factors. Individual factors include access to effective contraception and safe legalized abortion; lifecourse changes including women's increased education and labour market participation; and postponement of partnership formation. Structural factors include the increased cost of housing; economic uncertainty; and the absence of supportive family policies, such as paid maternity leave, flexible working arrangements, access to good-quality and affordable childcare, and job security (Mills et al., 2011). While research shows that most people want and expect to have children (Hammarberg et al., 2017a,b; Shreffler et al., 2017), postponement of parenthood increases the risk of involuntary childlessness and smaller families than desired due to age-related infertility (de Graaff et al., 2011; Schmidt et al., 2012). In addition to age, some potentially modifiable factors influence fertility and the chance of having a healthy baby, including nutrition, exercise, body weight, tobacco exposure, alcohol consumption and environmental toxins (Fleming et al., 2018; Stephenson et al., 2018).

A review of studies investigating knowledge about fertility, risk factors for infertility, and consequences of delaying childbearing found that most participants had low-to-moderate awareness about fertility, and concluded that interventions are needed to improve this (Pedro et al., 2018). Some argue that this lack of knowledge might contribute to later childbearing and unfulfilled parenthood aspirations, and suggest that improved public awareness about the potentially modifiable factors that affect fertility could reduce the risk of infertility and the need for infertility treatment (Harper et al., 2021).

'Your Fertility' is a government-funded fertility health promotion programme to increase awareness about fertility, and what people can do to improve their chance of conception. The programme was initiated in 2011, and data show that its reach has grown over the years and that it meets a need for accessible fertility-related information (Hammarberg et al., 2017a,b; Your Fertility, n.d.). Your Fertility commissions research from time to time to inform the programme's messaging. This article reports the findings from a population survey about people's parenthood aspirations, and knowledge about the factors that affect their chance of achieving them.

## Materials and methods

This project was approved by Monash University Human Research Ethics Committee (Project ID 18807).

## Study population

Members of the Social Research Centre's 'Life in Australia', a probability-based online panel, were invited to participate (Social Research Centre, n.d.). The panel was established in 2016 and is the most methodologically rigorous online panel in Australia. Australian residents aged  $\geq 18$  years are recruited at random via their landline or mobile telephone (rather than being self-selected volunteers), and those who consent provide their contact details to take part in monthly surveys (Social Research Centre, n.d.). Participants receive a small reward (AUD \$10–15) for each survey they complete. Results from Life in Australia surveys are generalizable to the Australian population. All active members aged between 18 and 45 years were eligible to participate.

## Materials

A study-specific questionnaire was developed by the authors who have extensive clinical and research expertise in reproductive health and health promotion. It included questions about sociodemographic characteristics (sex, age, relationship status and parenthood status); ideal number of biological children; experiences of infertility ['Have you and your (current or previous) partner been unable to get pregnant after 12 months or more of trying?' Yes/No]; confidence in personal understanding of different aspects of reproductive health (10-point scale where 1 is 'not at all confident' and 10 is 'entirely confident'); and beliefs about age at which male and female fertility start to decline ('20–24 years', '25–29 years', '30–34 years', '35–39 years', '40–44 years', '45–49 years', '50 years', 'Age doesn't affect fertility' and 'Don't know').

## Procedure

Through the Social Research Centre's regular communication, eligible panel members were made aware of the opportunity to complete a survey about fertility and childbearing. A mixed-mode approach was employed using online surveys supplemented with telephone interviews to include both online and offline populations. Data were collected from 18 February to 4 March 2019.

## Statistical analysis

To correct for differences between the study population and the general population of people of reproductive age in Australia, and ensure the sample most closely represents the relevant Australian adult population, results were weighted to population benchmarks. Data were analysed in SPSS V25 (IBM Corp. Armonk, NY, USA) using descriptive statistics. Gender and age group comparisons were made using Chi-squared statistics, and  $P < 0.05$  was considered to indicate significance.

## Results

### Participant characteristics

Of the 965 eligible members of Life in Australia, 716 (74.2%) completed the survey. The distribution of respondents broadly resembled the population; however, males and those aged 18–25 years were under-represented in the sample, and data were weighted accordingly. Of the respondents, 320 (45%) were male, 392 (55%) were female, and four did not state their sex. In terms of age, 102 (14%) were aged 18–24 years, 269 (38%) were aged 25–34 years, and 345 (48%) were aged 35–45 years. Respondent characteristics are shown in Table 1.

Over two-thirds of respondents (70%) were in a relationship. Younger respondents, aged 18–24 years, were significantly less likely to be in a relationship than older respondents.

Approximately two in five respondents (42%) reported that they had children. Over half of all respondents (56%) said that they wanted to have children, or to have more children, in the future. Most respondents had a preference for one or two children, but approximately one-third of respondents expressed the preference for three or more children. Women were significantly more likely than men to want to (or have wanted to) have three or more children. Approximately one in 10 respondents were undecided about how many children they would prefer to have, and a small minority (6%) did not want any biological children.

Approximately one in 10 respondents had experienced infertility (i.e. been unable to conceive after ≥12 months of trying). Amongst respondents aged 35–45 years, almost one in five (18%) had experienced infertility. As all respondents were asked this question, irrespective of whether they had ever tried for pregnancy, the higher proportion

of people in the oldest age group reporting that they had experienced infertility at some point likely reflects that they were more likely than younger people to have attempted pregnancy.

### Confidence in personal understanding of different aspects of reproductive health

The average confidence scores for personal understanding of eight aspects of reproductive health are shown in Table 2. Overall, respondents reported high levels of confidence about their understanding of preventative measures associated with safe sex and avoiding unwanted pregnancies. However, confidence in understanding of factors affecting the ability to conceive and how to protect fertility was lower. While moderate levels of confidence were recorded for understanding of how age and smoking affect fertility and in how the menstrual cycle works, the lowest average confidence scores were recorded for understanding of how weight affects fertility and how to protect fertility. Women and people in the oldest age group were significantly more confident in their understanding of the eight aspects of reproductive health than other groups.

### Beliefs about age at which female and male fertility start to decline

Respondents' beliefs about when female and male fertility start to decline are shown in Table 3. Broadly, respondents appeared to be aware that fertility starts to decline at a younger age for females than for males. There were no significant differences in the accuracy of the reported age at which female or male fertility starts to decline based on the gender of the respondent themselves. The correct age or younger was provided by 40% of respondents for female

Table 1 Participant characteristics (n = 716).

	Total n = 716	Gender		Age group (years)		
		Male (45%)	Female (55%)	18–24 (14%)	25–34 (38%)	35–45 (48%)
Relationship status (%)						
In a relationship (opposite-sex partner)	64	61	68	39 <sup>b</sup>	65 <sup>b</sup>	77 <sup>a</sup>
In a relationship (same-sex partner)	6	4	7	7	7	4
Not in a relationship	30	34	25	54 <sup>a</sup>	28 <sup>b</sup>	19 <sup>b</sup>
Parental status (%)						
Have one or more children	42	36 <sup>b</sup>	49 <sup>a</sup>	1 <sup>b</sup>	30 <sup>b</sup>	78 <sup>a</sup>
Want (more) biological children in the future	56	57	56	78 <sup>a</sup>	71 <sup>a</sup>	29 <sup>b</sup>
Parental preferences (%)						
Want to have (had) one or two biological children	52	54	51	56	54	49
Want to have (had) three or more biological children	34	29 <sup>b</sup>	39 <sup>a</sup>	29	31	39
Does not want to have biological children	6	9 <sup>a</sup>	3 <sup>b</sup>	7	5	5
Don't know/refused	9	8	8	8	10	7
Experience of infertility (%)						
Have experienced infertility	11	7	14	0 <sup>b</sup>	9 <sup>b</sup>	18 <sup>a</sup>

<sup>a</sup>Denotes significantly higher proportion.

<sup>b</sup>Denotes significantly lower proportion. Where one proportion is higher or lower, it is significantly different to its one or two counterparts within the same subgroup.

**Table 2** Average scores for confidence in understanding aspects of reproductive health (*n* = 716).

Statements related to personal understanding of reproductive health	Total	Gender		Age group (years)		
		Male	Female	18–24	25–34	35–45
How to avoid unwanted pregnancy	8.9	8.6 <sup>b</sup>	9.1 <sup>a</sup>	8.7 <sup>b</sup>	8.8	9.0 <sup>a</sup>
Safe sex and prevention of sexually transmitted infections	8.8	8.7 <sup>b</sup>	8.8 <sup>a</sup>	8.6 <sup>b</sup>	8.5 <sup>b</sup>	9.1 <sup>a</sup>
Biology of reproduction (process of conceiving a child)	8.2	8.1 <sup>b</sup>	8.4 <sup>a</sup>	7.9 <sup>b</sup>	8.2 <sup>b</sup>	8.5 <sup>a</sup>
How age affects fertility	7.8	7.6 <sup>b</sup>	8.0 <sup>a</sup>	7.5 <sup>b</sup>	7.7 <sup>b</sup>	8.1 <sup>a</sup>
How the menstrual cycle works	7.7	6.9 <sup>b</sup>	8.6 <sup>a</sup>	7.5 <sup>b</sup>	7.7 <sup>b</sup>	8.0 <sup>a</sup>
How smoking affects fertility	7.6	7.3 <sup>b</sup>	7.9 <sup>a</sup>	7.2 <sup>b</sup>	7.7 <sup>a</sup>	7.7 <sup>a</sup>
How weight affects fertility	6.8	6.4 <sup>b</sup>	7.2 <sup>a</sup>	6.0 <sup>b</sup>	6.8 <sup>b</sup>	7.3 <sup>a</sup>
How to protect fertility	6.2	6.0 <sup>b</sup>	6.4 <sup>a</sup>	5.6 <sup>b</sup>	6.2 <sup>b</sup>	6.6 <sup>a</sup>

<sup>a</sup>Denotes significantly higher proportion.

<sup>b</sup>Denotes significantly lower proportion. Where one proportion is higher or lower, it is significantly different to its one or two counterparts within the same subgroup.

age when fertility starts to decline, and by 65% of respondents for male age when fertility starts to decline. Almost one-third of respondents believed that female fertility starts to decline between 35 and 39 years of age, and another one-third of respondents believed that female fertility starts to decline at  $\geq 40$  years of age, or that age does not affect a woman's fertility. One in four respondents believed that male fertility starts to decline at  $\geq 50$  years of age, or that age does not affect a man's fertility.

## Discussion

This snapshot of people in Australia shows that most women and men want to have children or more children in the future, but lack confidence in their understanding of the factors that affect fertility and underestimate the effects of age on the ability to achieve pregnancy.

This study has strengths and limitations. The strengths are that the study population closely resembled the general population of people of reproductive age in Australia and included both women and men, the large sample size, and the relatively high response rate. Study limitations are also acknowledged. Self-selection bias, where people interested

in fertility and childbearing were more likely to participate than people who were not, cannot be ruled out. Also, as a brief survey, the findings do not allow in-depth understanding of how respondents' circumstances might influence their parenthood aspirations and knowledge about fertility. Nevertheless, the authors believe that the findings are important, and can inform health and education policy and fertility health promotion initiatives.

The finding that having children is a life goal for most women and men is also evident in other high-income countries. OECD reports that, on average across OECD countries with available data, the mean personal ideal number of children for men is just under 2.2 and for women is around 2.3, and that differences between age groups are small. Furthermore, on average, only 2% of women across OECD countries state that having no children is their ideal fertility option (OECD Family Database, 2016). However, the increasing age at first birth in most high-income countries may increase the risk of involuntary childlessness or people having fewer children than planned (OECD Family Database, 2019).

It was apparent that participants were much more confident in their knowledge about how to avoid sexually trans-

**Table 3** Beliefs about age when female and male fertility start to decline (*n* = 716).

Age when fertility starts to decline (years)	Female fertility decline (%)			Male fertility decline (%)		
	Total ( <i>n</i> = 716)	Male ( <i>n</i> = 320)	Female ( <i>n</i> = 392)	Total ( <i>n</i> = 716)	Male ( <i>n</i> = 320)	Female ( <i>n</i> = 392)
20–24	1	1	1	<1	1	0
25–29	8	7	9	3	4	2
30–34 <sup>a</sup>	31	29	33	10	11	10
35–39	29	27	31	15	13	16
40–44	18	20	17	23	24	22
45–49 <sup>b</sup>	7	8	6	14	11	17
$\geq 50$	4	6	2	19	21	16
Age doesn't affect fertility	2	2	2	16	15	17
Don't know/refused	1	1	0	<1	0	1

<sup>a</sup>Correct response for age when female fertility starts to decline.

<sup>b</sup>Correct response for age when male fertility starts to decline.



mitted infections (STIs) and unintended pregnancy than in their knowledge about the factors that influence fertility and how to protect fertility. This likely reflects the focus on safe sex to reduce the risk of STIs and unplanned pregnancy in school education. While this is important, the authors concur with others who advocate for broadening of sexual and reproductive health education and contraceptive counselling to include information about the impact of age and some health behaviours on the chance of having children in the future (Kisby Littleton, 2012; Lucke, 2015; Tydén et al., 2016).

The finding that almost one-third of participants in this study believed that a woman's fertility starts to decline after 40 years of age or that age does not affect a woman's fertility is concerning as evidence shows that it decreases gradually but significantly from approximately 32 years of age (ACOG, 2020). However, this is a lower proportion than in a population-based survey of Australians conducted almost a decade ago, when 42% thought that female fertility starts to decline after 40 years of age or that age does not affect fertility (Hammarberg et al., 2013). Although the impact of age on fertility occurs later and is less dramatic in men than in women, male age also contributes to the chance of conception (Sartorius and Nierschlag, 2010). As for female fertility, there appears to have been an improvement in knowledge about the impact of age on male fertility since the previous survey, with the proportion of respondents who believed that a man's fertility starts to decline after 50 years of age decreasing from 58% to 35% (Hammarberg et al., 2013). It is possible that the growing number of fertility health promotion initiatives is improving people's awareness about the effect of age on female and male fertility (Delbaere et al., 2020). Research is needed to evaluate existing fertility health promotion initiatives and to improve understanding of people's information-seeking behaviour and preferred sources of health information to ensure that efforts to improve awareness about fertility align with this.

Taken together, this study suggests that people of reproductive age in Australia have inadequate knowledge about the factors that affect the chance of achieving their parenthood goals. While fertility decision-making and timing of childbearing are influenced by a multitude of factors (Bodin et al., 2021; Boivin et al., 2018), more awareness that age, particularly female age, is the most influential determinant of chance of pregnancy might prompt some to reprioritize their life goals and start trying to conceive at an earlier age. Fertility health education initiatives are needed to allow people to make informed decisions about the timing of childbearing and reduce the risk of unfulfilled parenthood aspirations. Incorporating information about the factors that influence fertility and how to protect fertility into school education, and routinely asking people in primary care encounters about their pregnancy plans would create opportunities for people to become more knowledgeable about how they can optimize their chance of achieving their parenthood aspirations.

## References

ACOG. Committee Opinion No 589: Female age-related fertility decline, 2020. <https://www.acog.org/-/media/project/acog/>

- acogorg/clinical/files/committee-opinion/articles/2014/03/female-age-related-fertility-decline.pdf.
- Bodin, M., Holmström, C., Plantin, L., Schmidt, L., Ziebe, S., Elmerstig, E., 2021. Preconditions to parenthood: changes over time and generations. *Reprod. Biomed. Soc. Online* 13, 14–23.
- Boivin, J., Buntin, L., Kalebic, N., Harrison, C., 2018. What makes people ready to conceive? Findings from the International Fertility Decision-Making Study. *Reprod. Biomed. Soc. Online* 6, 90–101.
- de Graaff, A.A., Land, J.A., Kessels, A.G.H., Evers, J.L.H., 2011. Demographic age shift toward later conception results in an increased age in the subfertile population and an increased demand for medical care. *Fertil. Steril.* 95, 61–67.
- Delbaere, I., Verbiest, S., Tyden, T., 2020. Knowledge about the impact of age on fertility: a brief review. *Ups. J. Med. Sci.* 125, 167–174.
- Fleming, T.P., Watkins, A.J., Velazquez, M.A., Mathers, J.C., Prentice, A.M., Stephenson, J., Barker, M., Saffery, R., Yajnik, C.S., Eckert, J.J., et al., 2018. Origins of lifetime health around the time of conception: causes and consequences. *The Lancet* 391, 1842–1852.
- Hammarberg, K., Collins, V., Holden, C., Young, K., McLachlan, R., 2017a. Men's knowledge, attitudes and behaviours relating to fertility. *Hum. Reprod. Update* 23, 458–480.
- Hammarberg, K., Norman, R.J., Robertson, S., McLachlan, R., Michelmore, J., Johnson, L., 2017b. Development of a health promotion programme to improve awareness of factors that affect fertility, and evaluation of its reach in the first 5 years. *Reprod. Biomed. Soc. Online* 4, 33–40.
- Hammarberg, K., Setter, T., Norman, R., Holden, C., Michelmore, J., Johnson, L., 2013. Knowledge about factors that influence fertility among Australians of reproductive age: a population-based survey. *Fertil. Steril.* 99, 502–507.
- Harper, J., Hammarberg, K., Simopoulou, M., Koert, E., Pedro, J., Massin, N., Balen, A., 2021. The International Fertility Education Initiative: Research and action to improve fertility awareness. *Hum. Reprod. Open.* <https://doi.org/10.1093/hropen/hoab031>.
- Kisby, L.F., 2012. Fertility, the reproductive lifespan and the formal curriculum in England: a case for reassessment. *Sex Educ.* 12, 483–497.
- Lucke, J., 2015. Better Sex Education for Young People Is a Public Health Solution to the Problem of Advanced Maternal Age. *Am. J. Bioethics* 15, 58–60.
- Mills, M., Rindfuss, R.R., McDONALD, P., te Velde, E., 2011. Why do people postpone parenthood? Reasons and social policy incentives. *Hum. Reprod. Update* 17, 848–860.
- OECD Family Database, 2016. Ideal and actual number of children. [https://www.oecd.org/els/family/SF\\_2\\_2-Ideal-actual-number-children.pdf](https://www.oecd.org/els/family/SF_2_2-Ideal-actual-number-children.pdf) 2016.
- OECD Family Database, 2019. Age of mothers at childbirth and age-specific fertility. [https://www.oecd.org/els/soc/SF\\_2\\_3\\_Age\\_mothers\\_childbirth.pdf](https://www.oecd.org/els/soc/SF_2_3_Age_mothers_childbirth.pdf).
- Pedro, J., Brandao, T., Schmidt, L., Costa, M.E., Martins, M.V., 2018. What do people know about fertility? A systematic review on fertility awareness and its associated factors. *Ups. J. Med. Sci.* 123, 71–81.
- Sartorius, G.A., Nierschlag, E., 2010. Paternal age and reproduction. *Hum. Reprod. Update* 16 (1), 65–79.
- Schmidt, L., Sobotka, T., Bentzen, J.G., Nyboe, A.A., 2012. Demographic and medical consequences of the postponement of parenthood. *Hum. Reprod. Update* 18, 29–43.
- Shreffler, K.M., Greil, A.L., McQuillan, J., 2017. Responding to Infertility: Lessons From a Growing Body of Research and Suggested Guidelines for Practice. *Family Relat.* 66, 644–658.
- Social Research Centre, n.d. [www.srcentre.com.au](http://www.srcentre.com.au)
- Stephenson, J., Heslehurst, N., Hall, J., Schoenaker, D.A.J.M., Hutchinson, J., Cade, J.E., Poston, L., Barrett, G., Crozier, S.R., Barker, M., et al., 2018. Before the beginning: nutrition and

- lifestyle in the preconception period and its importance for future health. *The Lancet* 391, 1830–1841.
- Tydén, T., Verbiest, S., Van Achterberg, T., Larsson, M., Stern, J., 2016. Using the Reproductive Life Plan in contraceptive counselling. *Ups. J. Med. Sci.* 121, 299–303.
- Wang, H., Abbas, K.M., Abbasifard, M., Abbasi-Kangevari, M., Abbastabar, H., Abd-Allah, F., Abdelalim, A., Abolhassani, H., Abreu, L.G., Abrigo, M.R.M., et al., 2020. Global age-sex-specific fertility, mortality, healthy life expectancy (HALE), and population estimates in 204 countries and territories, 1950–2019: a comprehensive demographic analysis for the Global Burden of Disease Study 2019. *The Lancet* 396, 1160–1203.
- Your Fertility, n.d. [www.yourfertility.org.au](http://www.yourfertility.org.au).
- Declaration: The author reports no financial or commercial conflicts of interest.*
- Received 22 July 2021; refereed 13 October 2021; accepted 29 November 2021.