

RESEARCH ARTICLE

Uninformed decision-making and regret about delaying childbearing decisions: A cross-sectional study

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Abstract

Aim: The aim of this study was to examine regret over the timing of the childbearing decision and reasons for its delay.

Design: A cross-sectional study.

Methods: This cross-sectional study included 219 women and 169 men referred to fertility facilities in Japan from July–December 2018. Participants completed a questionnaire on the reasons for their delay in childbearing decision and the degree of regret regarding their decision. Multiple linear regression was used to analyse the association between degree of regret and the reasons for the delay.

Results: The top three reasons for the delay in childbearing decision in women were “Establishing the relationship,” “Health problems,” and “Financial security.” The top three reasons in men were “Establishing the relationship,” “Financial security,” and “Lack of fertility knowledge.” Multiple linear regression showed that lack of fertility knowledge was associated with regret over the timing of childbearing decisions in women and men.

KEYWORDS

decision-making, fertility, knowledge, regret, reproductive behaviour

1 | INTRODUCTION

Mean maternal and paternal ages at first birth have steadily increased over the past two decades in Japan, from 27.5 and 30.0 years in 1995 to 30.7 and 32.8 years in 2016, respectively (Ministry of Health, Labour, & Welfare [MIHLW], 2017). Advanced age has been associated with an increased rate of infertility.

Women and men in some developed countries delay childbearing for reasons such as establishing their relationship, financial security, educational pursuits, career development and based on their personal and their partner's interest or desire to have children (Hammarberg & Clarke, 2005; Mills, Rindfuss, McDonald, & te Velde, 2011; Roberts, Metcalfe, Jack, & Tough, 2011; Thompson & Lee, 2011). Additionally, a lack of fertility knowledge such as

age-related infertility and risk factors of infertility has been noted (Bunting, Tsibulsky, & Boivin, 2013; Hammarberg et al., 2013; Maeda et al., 2015).

Previous qualitative studies have reported that women and men who delayed the timing of childbearing decisions experienced feelings of regret (Koert & Daniluk, 2017; Loke, Yu, & Hayter, 2012; Mac Dougall, Beyene, & Nachtigall, 2013). It is important for early reproductive-aged women and men to make informed reproductive decisions so as not to experience regret later in life.

Japanese Nursing Association-certified nurses in infertility nursing have extensive knowledge about reproductive medicine and support infertile patients in a clinical setting. The future of infertility nursing must be centred on providing the public with information leading to informed choices about their reproductive life (Boivin,

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Bunting, & Gameiro, 2013). They would be able to empower early reproductive-aged women and men to make informed decisions to reach their parenthood goals.

2 | BACKGROUND

Several studies have examined the reasons people delay childbearing. The studies focus on various viewpoints such as attitudes towards parenthood (Benzies et al., 2006; Tydén, Svanberg, Karlström, Lihoff, & Lampic, 2006), influencing factors on timing of parenthood (Cooke, Mills, & Lavender, 2012; Schytt, Nilsen, & Bernhardt, 2014) and awareness of age-related risk (Hammarberg & Clarke, 2005; Peterson, Pirritano, Tucker, & Lampic, 2012). The reasons for delaying childbearing decisions reported in previous studies were establishing their relationship, financial security, educational pursuits, career development and based on their personal and their partner's interest or desire to have children (Hammarberg & Clarke, 2005; Mills et al., 2011; Roberts et al., 2011; Thompson & Lee, 2011). In addition to individual and social factors to delaying childbearing, some studies reported a lack of fertility knowledge, particularly the relationship between age and fertility, as a problem (Mac Dougall et al., 2013; Peterson et al., 2012; Tydén et al., 2006). In an international study, Japanese men and women had the second lowest fertility knowledge among participants from 18 countries (Bunting et al., 2013). Uninformed decision-making about delaying having children may ultimately cause involuntary childlessness (Peterson et al., 2012).

Regret arises from the contrast between a negative outcome resulting from an erroneous decision and an alternative, better outcome that might have happened (Gilovich & Medvec, 1995; Zeelenberg, van Dijk, Manstead, & van der Pligt, J., 2000). Women and men experiencing regrets in retrospect stated that they should have thought more seriously about having children when they were young (Loke et al., 2012) and thought about the priority between childbearing decisions and achieving other life goals (Mac Dougall et al., 2013). Moreover, they expressed that no one provided them information on fertility (Loke et al., 2012). Information on fertility is important for early reproductive-aged women and men to make informed reproductive decisions to prevent regret later in life.

In the literature on regret and delaying the decision to have children, the feeling of regret is mentioned only in qualitative research interviews. The present study examined the degree of regret over the timing of childbearing decisions and reasons for delay among Japanese women and men seeking fertility treatment. In addition, we examined the association between regret over the timing of decisions and the reasons for the delay. Identifying the reasons for delaying childbearing decisions and their relationship to regret builds evidence for the need to provide early reproductive-aged women and men with information leading to informed choices about their reproductive life. Moreover, informing early reproductive-aged women and men about such patients' experiences makes them reflect more seriously about having children in the future.

3 | METHODS

3.1 | Study design and participants

This was a cross-sectional study using a self-administered questionnaire conducted from July–December 2018. The study was conducted in accord with prevailing ethical principles and was approved by the Research Ethics Committee of Osaka University (No. 18041). We recruited couples seeking fertility treatment in fertility facilities designated in the fertility treatment support project by the MIHLW in Japan. The recruitment of participants was aimed at ensuring that the sample was representative of the general population of women and men seeking fertility treatment. First, we divided the Japanese archipelago into two regions, East and West. The two regions were comparable in terms of the number of fertility facilities: 361 in East Japan and 350 in West Japan. We then identified the facilities with fertility counsellors certified by the Japan Society for Infertility Counseling. In consideration of ethics when conducting research with human subjects, fertility counsellors could carefully explain the intention of our study to the participants to minimize any psychological burden related to answering the questionnaire. There were also certified nurses in these facilities to care for and support infertile patients. Finally, we selected nine independent facilities based on their size: four in East Japan and five in West Japan.

The sample comprised couples seeking infertility treatment who had been referred to the facility. At the recruitment stage, potential participants were not excluded based on primary or secondary infertility. However, the final sample included only those women and men with primary infertility (those without a child), because the focus of the present study was on the reasons for delaying the childbearing decision for the first child. Of 641 couples that were recruited, 457 individuals completed the survey (35.6% response rate). Of the 457 individuals, 388 were without a child (219 women and 169 men). There were no missing values for the response data used for statistical analysis. The mean age of the women was 34.9 (*SD* 5.0), and the mean age of the men was 35.9 (*SD* 5.7). All participants were married. The mean age when participants married was 31.3 (*SD* 5.1) and 32.5 (*SD* 5.9) for women and men, respectively. Detailed demographic and fertility data by gender are provided in Table 1.

3.2 | Measures

The degree of regret over the timing of the childbearing decision was assessed with the question, "Would you like to have made a childbearing decision at an earlier time in your life?" Participants responded to the question using a seven-point Likert scale where 1 = *strongly disagree* and 7 = *strongly agree*.

We assessed eight reasons for the delay in childbearing decisions selected from previous studies (Hammarberg & Clarke, 2005; Metcalfe, Vekved, & Tough, 2014; Tough, Benzies, Fraser-Lee, & Newburn-Cook, 2007). The reasons were as follows: (1) I wanted children earlier but I was not in a relationship (establishing the

TABLE 1 Demographic and fertility characteristics

Characteristics	Women (N = 219)	Men (N = 169)
	N (%)	N (%)
Age when married		
20–29	100 (45.7)	67 (39.6)
30–39	106 (48.4)	76 (45.0)
40–49	11 (5.0)	25 (14.8)
Missing data	2 (0.9)	1 (0.6)
Education		
Junior high school	4 (1.8)	4 (2.4)
High school	40 (18.3)	35 (20.7)
Junior college	43 (19.6)	3 (1.8)
University	83 (37.9)	85 (50.3)
Graduate school	14 (6.4)	24 (14.2)
Other	35 (16.0)	18 (10.7)
Employment status		
Employed full-time	94 (42.9)	150 (88.8)
Employed part-time	66 (30.1)	4 (2.4)
Self-employed	11 (5.0)	14 (8.3)
Without paid work	45 (20.5)	0 (0.0)
Other	1 (0.5)	1 (0.6)
Missing data	2 (0.9)	0 (0.0)
Annual household income		
<4 million JPY	24 (11.0)	9 (5.3)
4–7 million JPY	125 (57.1)	115 (68.0)
≥8 million JPY	69 (31.5)	45 (26.6)
Missing data	1 (0.5)	0 (0.0)
Duration of infertility		
<12 months	30 (13.7)	22 (13.0)
12–23 months	73 (33.3)	56 (33.1)
24–35 months	55 (25.1)	461 (24.3)
36–47 months	24 (11.4)	27 (16.0)
≥48 months	36 (16.4)	23 (13.6)
Used assisted reproductive technology		
No	151 (68.9)	117 (69.2)
Yes	67 (30.6)	51 (30.2)
Missing data	1 (0.5)	1 (0.6)

relationship); (2) I wanted to be financially secure before having children (financial security); (3) I was not interested in having children until recently (personal desire to have children); (4) I wanted to pursue my career before having children (career development); (5) I wanted children earlier but I could not get support from my workplace (workplace support); (6) I was unaware that women's chance of having children is age-related (lack of fertility knowledge); (7) I wanted children earlier but my partner was not interested in having children (partner's desire to have children); and (8) health problems prevented me from having children earlier (health

problems). Participants responded to each of the reasons as to how strongly they agreed that the reason influenced the timing of the childbearing decision using a seven-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*). We also asked for information on demographics (age, gender, age when married, education, employment status and annual household income) and fertility (previous live birth, duration of infertility and use of assisted reproductive technology).

3.3 | Procedures

Oral and written information about the study and an informed consent form were given by staff or the researcher who is the first author of this study to couples or individual women and men who came to the fertility facilities. The staff who asked the patients to participate in the study were fertility counsellors certified by the Japan Society for Infertility Counseling. The couples or individuals who indicated their intention to participate in the study received two copies of the questionnaire. If the couple was present, they were both given a questionnaire. If only one person was present, they were given two questionnaires: one for themselves and the other for their partner. The questionnaires were taken home and returned by mail within two weeks.

3.4 | Statistical analyses

Descriptive statistics were calculated to examine the degree of regret over the timing of childbearing decisions and reasons for delaying decisions. The Mann–Whitney *U* test was used to assess differences in the degree of regret between women and men. Multiple linear regression analyses adjusting for age and the duration of infertility were used to investigate whether the eight reasons for the delay in childbearing decisions were associated with regret over the timing of the decision.

It was estimated that an appropriate sample size was 150 couples for the multiple linear regression analyses, which is based on 15 times the number of independent variables. Data were analysed using IBM SPSS Statistics for Windows version 25.0 (IBM Corporation), and the level of significance was set at .05.

4 | RESULTS

4.1 | Regret and the timing of childbearing decisions

Table 2 shows the degree of regret over the timing of childbearing decisions in response to the question, “Would you like to have made a childbearing decision at an earlier time in your life?” Those who answered *agree* or *strongly agree* comprised 57.5% of the women and 46.2% of the men. The Mann–Whitney *U* test showed that scores for regret were significantly higher for women than men ($p < .001$).

TABLE 2 Regret over the timing of the childbearing decision

	"Would you like to have made a childbearing decision at an earlier time of your life?"								Median (IQR ^a)	p value
	Strongly disagree N (%)	Disagree N (%)	Somewhat disagree N (%)	Neither agree nor disagree N (%)	Somewhat agree N (%)	Agree N (%)	Strongly agree N (%)			
Women (N = 219)	5 (2.3)	10 (4.6)	7 (3.2)	27 (12.3)	44 (20.1)	34 (15.5)	92 (42.0)	6 (5, 7)	<.001	
Men (N = 169)	7 (4.1)	10 (5.9)	17 (10.1)	29 (17.2)	28 (16.6)	41 (24.3)	37 (21.9)	5 (4, 6)		

^aInterquartile range.

4.2 | Reasons for the delay in childbearing decisions

Table 3 shows the reasons for the delay in childbearing decisions for men and women in the order of highest to lowest mean scores. Participants who responded with *agree* or *strongly agree* were considered as those who agreed. For women, the top three reasons with the highest mean scores were as follows: (1) establishing the relationship; (2) health problems; and (3) financial security, in that order. For the men, the order for the top three reasons was as follows: (1) establishing the relationship; (2) financial security; and (3) lack of fertility knowledge. The reason for the delay in childbearing decision where 20% or more answered *agree* or *strongly agree* was establishing the relationship (32.4% of the women and 23.7% of the men). The per cent of agreement for all the other reasons was <20%.

4.3 | Delaying childbearing decisions and subsequent regret

Table 4 shows the association between regret over the timing of childbearing decisions and the eight reasons for delaying the decisions after adjusting for age and duration of infertility. Multiple linear regression analyses revealed that lack of fertility knowledge was a significant positive predictor of regret over the timing of childbearing decisions in both women and men. In men, health problems were also a significant positive predictor of regret over the timing of decisions.

5 | DISCUSSION

This cross-sectional study investigated the degree of regret over the timing of childbearing decisions and reasons for delaying the decisions among Japanese women and men seeking fertility treatment. We also explored the association between regret over the timing and reasons for the delay.

Women and men who had feelings of regret over delaying childbearing decisions were 57.3% and 49.5%, respectively. The most common reasons for the delay in childbearing decision for both women and men were establishing their relationship and having financial security. These findings are similar to the reasons reported in a study of women seeking fertility treatment in Australia (Hammarberg & Clarke, 2005). A stable relationship has been identified as the most important factor for childbearing (Lampic, Svanberg, Karlström, & Tydén, 2006; Tough et al., 2007). Although the participants in the present study were all married at the time of the study, it had taken a long time for them to find a stable partner or to get married. Financial security was the second most important reason in the Australian study and the second most important reason that men and women had in common in the present study. Financial stability is certainly essential for parenting children. However, women and men must also understand the cost of fertility treatment (Daniluk, Koert, & Cheung, 2012; Tough et al., 2007) because they potentially may

TABLE 3 Reasons for the delay in childbearing decisions

Women (N = 219) Reason	Mean (SD)	Women who agreed ^a N (%)	Men (N = 169) Reason	Mean (SD)	Men who agreed ^a N (%)
Establishing the relationship	3.3 (2.2)	71 (32.4)	Establishing the relationship	3.8 (2.4)	40 (23.7)
Health problems	3.2 (2.1)	36 (16.4)	Financial security	3.2 (2.1)	31 (18.3)
Financial security	3.1 (2.0)	33 (15.1)	Lack of fertility knowledge	2.8 (1.8)	15 (8.9)
Lack of fertility knowledge	2.8 (1.9)	27 (12.3)	Career development	2.4 (1.7)	10 (5.9)
Career development	2.7 (2.0)	27 (12.3)	Health problems	2.2 (1.8)	16 (9.5)
Workplace support	2.7 (1.8)	20 (9.1)	Personal desire to have children	2.2 (1.5)	5 (3.0)
Personal desire to have children	2.1 (1.5)	9 (4.1)	Workplace support	2.0 (1.3)	5 (3.0)
Partner's desire to have children	1.9 (1.4)	6 (2.7)	Partner's desire to have children	1.8 (1.3)	4 (2.4)

^aThe numbers and percentages include participants who responded with *agree* or *strongly agree*.

TABLE 4 Reasons for the delay in childbearing decisions associated with regret adjusting for age and the duration of infertility

Characteristics	Women (N = 219) R = .384; R ² = .148; Adjusted R ² = .107, p < .001				Men (N = 169) R = .404; R ² = .164; Adjusted R ² = .111, p = .001			
	Non-standardized coefficient (B)	95% CI	Standardized coefficient (β)	p value	Non-standardized coefficient (B)	95% CI	Standardized coefficient (β)	p value
Age	0.085	0.037 to 0.132	0.264	.001	0.033	-0.017 to 0.082	0.109	.194
Duration of infertility	-0.003	-0.012 to 0.005	-0.054	.450	0.017	0.003 to 0.031	0.192	.016
Reason for delaying childbearing decisions								
(1) Establishing the relationship	-0.030	-0.125 to 0.065	-0.046	.534	-0.060	-0.191 to 0.070	-0.076	.364
(2) Financial security	0.111	-0.008 to 0.229	0.139	.068	-0.067	-0.224 to 0.098	-0.082	.399
(3) Personal desire to have children	-0.115	-0.269 to 0.038	-0.111	.139	0.046	-0.145 to 0.237	0.041	.634
(4) Career development	-0.033	-0.165 to 0.099	-0.041	.625	-0.006	-0.208 to 0.195	-0.006	.952
(5) Workplace support	0.042	-0.088 to 0.173	0.049	.522	-0.093	-0.307 to 0.122	-0.073	.395
(6) Lack of fertility knowledge	0.197	0.075 to 0.318	0.232	.002	0.227	0.083 to 0.371	0.238	.002
(7) Partner's desire to have children	0.029	-0.130 to 0.189	0.026	.718	-0.010	-0.206 to 0.187	-0.007	.922
(8) Health problems	-0.054	-0.157 to 0.048	-0.071	.300	0.186	0.039 to 0.332	0.196	.013

spend more money for fertility treatment by delaying the childbearing decision; this may cause more financial hardship (Cooke, Mills, & Lavender, 2010).

Except for establishing the marital relationship as a reason for delay in childbearing decisions, all other reasons were endorsed by <20% of the participants. Our results suggest that perhaps some

of the participants may have delayed the childbearing decision for reasons that were not covered in our survey or it may be that there was no apparent reason for the delay. The Centers for Disease Control and Prevention (CDC; CDC, 2006) encourages women and men to have a reproductive life plan. Making a reproductive life plan gives women and men an opportunity to explore their values

and preferences about whether or when to have children (Morse & Moos, 2018).

One reason for regretting the timing of the childbearing decision was lack of fertility knowledge, which was found in both women and men. Many studies have reported that fertility knowledge is necessary to prevent women and men from delaying childbearing decisions (Daniluk & Koert, 2015; García, Vassena, Prat, & Vernaeve, 2016). School-based sex education in Japan has traditionally focused on contraception and sexually transmitted diseases (Maeda et al., 2015). Such a traditional model of sex education might lead to overestimating the chances of conception (Mac Dougall et al., 2013; Maheshwari, Porter, Shetty, & Bhattacharya, 2008) and uninformed decision-making about the timing of childbearing. It is important to know not only how to avoid pregnancy but also how to achieve healthy conception. "Preconception care" aims to have women and men think about their future regarding pregnancy, be conscious of caring for their health and live a healthy life (CDC, 2006). In the United States, several states have developed tools to facilitate a reproductive life plan and promote preconception health; some tools have also been developed for middle school and high school students (Nobles-Botkin, Lincoln, & Cline, 2016). We, therefore, need to provide information for a reproductive life plan in school-based sex education in Japan to prevent regret later in life. Certified nurses in infertility nursing are the right professionals to play this role with the latest fertility knowledge and experience in caring for infertile patients.

The present study found an association between health problems and regret over the timing of childbearing decisions only in men. In women, it was the second most important reason for delaying childbearing but was not related to feelings of regret. Men typically do not consider how their health may be associated with the physiological difficulties of having a child (Thompson & Lee, 2011); however, men who attended fertility counselling reported that they had tried to change their lifestyle behaviours after becoming aware of their fertility problem (Sylvest et al., 2018). Preconception care, which is health care before pregnancy, can ameliorate disease, improve the risk status and prevent poor pregnancy outcomes (Freda, Moos, & Curtis, 2006; Jack & Culpepper, 1990). The CDC (2006) states that preconception health is important for both women and men; there are behaviours they can do for their own health, such as preventing sexually transmitted infections, quitting smoking and maintaining a healthy weight. Educating people on preconception health may allow them to make informed reproductive choices and decisions (Cooke et al., 2012).

The timing of childbearing decisions is an individual one, so it does not mean that the decision to delay childbearing is wrong or will necessarily result in feelings of regret. However, it is important for early reproductive-aged women and men to have the opportunity to think about parenting and to decide what is best for them with accurate and sufficient fertility knowledge. Certified nurses in infertility nursing should promote fertility knowledge including preconception health and encourage informed decision-making about the timing of childbearing.

5.1 | Limitations

There are two important limitations to this study that should be noted. First, the sample comprised only women and men who were seeking fertility treatment. Therefore, regret over the timing of childbearing decisions and reasons for delaying decisions may not be representative of women and men not seeking such treatment or those who were unsuccessful after attempting fertility treatment. Second, our retrospective design may result in recall bias because the accuracy of the participants' memories may be influenced by subsequent events and experiences, thereby posing a potential threat to the internal validity of the study.

6 | CONCLUSIONS

Common reasons for the delay in childbearing decisions for both women and men wanted to first establish their marital relationship and having financial security. Additionally, for both women and men, the reason associated with feelings of regret for delaying decisions was a lack of fertility knowledge. The lack of knowledge therefore permits making an uninformed decision. It is important for women and men to have fertility knowledge to make informed decisions about the timing of childbearing, although the timing of the childbearing decision is an individual one that involves considering many factors. The next challenge in infertility nursing is to provide early reproductive-aged women and men with preconception care leading to informed choices about their reproductive life. Certified nurses in infertility nursing should pursue opportunities to promote fertility knowledge in early reproductive-aged women and men. In addition, health problems were associated with regret in men, while it was the second most important reason for the delay in childbearing decisions in women. To avoid any regret in their reproductive life, it would be important for women and men to acquire fertility knowledge and good health through preconception care.

ACKNOWLEDGEMENTS

We are grateful to the participants and staff of the fertility facilities for their cooperation in this study. We would like to express our gratitude to the fertility facilities and Japan Society for Infertility Counseling for their cooperation.

CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

TA and KO designed the study and interpreted all the data. TA collected and analysed the data and wrote the first draft of the manuscript. ME and KO were involved in critically assessing the manuscript. All authors read and approved the final manuscript.

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How to cite this article: Adachi T, Endo M, Ohashi K. Uninformed decision-making and regret about delaying childbearing decisions: A cross-sectional study. *Nursing Open*. 2020;7:1489–1496. <https://doi.org/10.1002/nop2.523>