

# Investigation of understanding the influence of age on fertility in Kazakhstan: reality the physicians need to face in IVF clinic

G. Utepova<sup>1</sup>, M. Terzic<sup>1,2,3</sup>, G. Bapayeva<sup>1</sup>, S. Terzic<sup>2</sup>

<sup>1</sup>Department of Obstetrics and Gynecology, National Research Center of Mother and Child Health, University Medical Center, Astana

<sup>2</sup>Department of Medicine, Nazarbayev University School of Medicine, Astana (Kazakhstan)

<sup>3</sup>Department of Obstetrics, Gynecology and Reproductive Sciences, University of Pittsburgh, School of Medicine, Pittsburgh, Pennsylvania (USA)

## Summary

**Introduction:** Women's intentions to delay attempting a family until later in life is well known all over the world, but their knowledge of this behavior's influence on fertility rate, as well as all the accompanying disadvantages that might appear, has not been systematically investigated. Therefore, the aim of the study was to investigate women's awareness of delayed childbearing age on fertility rate and IVF procedure success in Kazakhstan. **Materials and Methods:** The investigation was carried out at Department of Obstetrics and Gynecology, National Research Center of Mother and Child Health, University Medical Center, Astana, throughout a period of 24 months. The questionnaires consisting of 44 open-ended questions were given to 82 women aged over 40, who came for consultation to IVF unit due to infertility. **Results:** 31.7% of women in this cohort first attempted conception at an average age more than 35, while 61% stated that they had some awareness that fertility declined after age 40. Yet 90.2% of women expected their fertility to decline gradually until menopause at around 50 years and 30.5% reported that they expected to become pregnant without difficulty at age 40. Very few participants had considered the possibility that they would need IVF and 53.7% reported being 'shocked' and 'alarmed' to discover that their understandings of the rapidity of age-related reproductive decline were inaccurate. 97.6% of women advocated better fertility education earlier in life, so that men and women could acquire more information regarding childbearing decisions and 80.5% of women indicated that with more information regarding declining fertility, they might have attempted conception at an earlier age. **Conclusion:** Participants did not have a clear understanding of age influence on fertility decline. Moreover, over half of women were 'shocked' to discover that the chances of conception at their advanced ages were lower than they had previously anticipated. Although the failure to appreciate the true biological relationship between aging and fertility may reflect inaccessibility or misinterpretation of information, it was found not to be sufficient to explain the decades-long socio-demographic phenomenon of delayed childbearing.

**Key words:** Age and fertility; Delayed childbearing; Fertility education.

## Introduction

Infertility is found to be a serious health issue, behaving as an "epidemic", and affecting about 12% of all women of reproductive age, with a tendency to increase [1]. Obviously, approaches of modern women to family planning and becoming pregnant have changed. Nowadays, every fifth woman on the planet gives birth to her first child after 35 years, which is eight times higher than in the previous generation [2]. There are many psychosocial determinants of women's decisions to delay childbearing. On the other hand, this dramatic demographic shift towards delayed procreation is linked to the rapid development of assisted reproductive technologies (ART), especially in vitro fertilization (IVF). Since 1985 the number of IVF procedures in the world is increasing, found to be as much as 50-fold annually, with the half of them performed in women aged over 35.

Some women postpone becoming pregnant as they erroneously think ART is effective irrespective of age, and can compensate fully for the natural decline in fertility with age

[3]. On the contrary, the consequences of advancing maternal age do not only affect the risk of natural and assisted conception, but also the outcome of pregnancy even in normal women, hence those becoming pregnant spontaneously [4].

Patient understanding of the effect of lifestyle behavior on fertility rate as well as IVF success has not been extensively studied. Existing literature shows gaps in patient knowledge and resulting behaviors range from unnecessary to harmful [5, 6].

Socio-economic reforms in Kazakhstan occurring in recent decades accelerated the transition from a traditional to a new type of reproductive behavior. Actually, doctors are facing the fact of late birth of the first child in Kazakhstan. On the other hand, it is unclear whether women are aware of their current behavior of delayed childbearing age.

The aim of this study was to investigate the women's understanding of the influence of delayed childbearing age on their fertility.

Revised manuscript accepted for publication May 28, 2018

Table 1. — *Demographic and sociological characteristics of women (n = 82).*

	n	%
Total number of women	82	100
Family status		
Registered marriage	23	28.0
Civil marriage	47	57.3
Single women	12	14.7
Ethnicity		
Kazakhs	50	61.0
Russians	23	28.0
Tatar	4	4.9
Korean women	3	3.7
Other nationalities	2	2.4
Job		
Women with paid work at the time of visit	79	96.3
Women without paid work at the time of visit	3	3.7
Education		
Specialized secondary	11	1.2
Higher education	71	86.6
Academic degree	2	2.4

## Materials and Methods

The study was carried out at Department of Obstetrics and Gynecology, National Research Center of Mother and Child Health, University Medical Center, Astana, throughout a period of two years (2016-2017). The anonymous questionnaires consisting of 44 open-ended questions were given to 82 women aged over 40, who came for consultation to IVF unit, due to infertility from various regions of Kazakhstan. The questionnaires focused on how decisions were made regarding later reproduction and the use of reproductive technologies. Data also included women's anonymous responses to semi-structured and open interview questions: "At what age did you consciously start planning pregnancy?", "What information did you have about the relationship between fertility and age before you started trying to get pregnant?" and "What information did you get after consultation with your infertility specialist?"

## Results

The study included 82 women. The demographic and sociological characteristics of the cohort are presented in Table 1.

The authors found that 70 (85.3%) women were married, mostly legally, while 12 (14.7%) were single, but with a permanent sexual partner. The majority of participants were of indigenous nationality (61%), they worked (96.3%), had higher education (86.6%), including a graduate degree (26.8%).

Every third of the women who resorted to infertility (31.7%) began to plan their pregnancy only after age of 35 (Table 2). Among the main reasons for late planning were: later marriage, lack of a sexual partner, the need for career growth, graduation, lack of housing, money, etc.

Women who planned their first pregnancy before the age of 35 (56), but who did not give birth at the time of going to the clinic, explain the delay in obtaining the result of

Table 2. — *Age of first pregnancy planning (n = 82).*

Age (years)	Number of women	
	n	%
Up to 24	2	2.4
25-29	15	18.3
30-35	39	47.6
36-40	22	26.8
Older than 40	4	4.9
TOTAL	82	10

medical problems and lack of knowledge about the predictions of their fertility.

Awareness of women about the relationship between age and the risk of infertility is presented in Table 3. It resulted that out of 61% of women were informed that their fertility was declining after 40 years. However, in the group of women planning pregnancy after 35 years, the number of those who were aware was significantly less and was 30.8% compared to 75% in the group of women who wanted to become pregnant before the age of 35. It is alarming that the overwhelming majority of women in the study cohort [74 (90.2%)] stated that they were convinced that the ability to bear childbearing persists until menopause. The age of menopause in their opinion varied on average from 50 to 55 years. Thus, every third (30.5%) woman expected that she would not have any problems with the onset of pregnancy over the age of 40.

Table 4 summarizes a number of explanations for the questionnaire of its alleged reliable fertility. Every third woman remembers the constant emphasis of all sources of information from adolescence on the prevention of pregnancy, the risk of abortion, and complications after them, which created the illusion of a quick and simple pregnancy. In addition, it resulted that 46.3% of the interviewed women were convinced that if they lead a healthy lifestyle, are engaged in fitness, take care of weight, have a healthy diet, and their parents have many children, that these are a guarantee of their ability to conceive. Also, 29.3% of those surveyed noticed that the confidence of simple and trouble-free conception is constantly fuelled by the frequent mention in the media of successful elderly primogeniture celebrities.

As seen in Table 5, more than half (63.4%) of participants attempted to become pregnant within 6-14 years, including receiving various types of treatments from specialists (range: 6 months-18 years). According to the questionnaire, in the first three years after the diagnosis of infertility, only 16 (19.5%) women consulted with a reproductive specialist.

The majority of patients (remaining 80.5%) were treated by doctors at general health centers (primary care level) or by non-core specialists for many years, but without success. Almost two-thirds of participants independently resorted to infertility consultations; the remaining third of women was referred to IVF clinics by attendant OBGYN

Table 3. — *Awareness of the age and risk of infertility (n = 82).*

	The number of women n = 82 (100%)	The number of women who planned the first pregnancy aged	
		up to 35 (n = 56)	older than 35 (n = 26)
Fertility decreases after 40 years	50 (61%)	42 (75%)	8 (30.8%)
Fertility persists until menopause	74 (90,2%)	49 (87,5%)	25 (96.2%)
It was expected that it would be easy to become pregnant at the age of over 40	25 (30,5%)	17 (30.4%)	8 (30.8%)

Table 4. — *Assumptions of fertility (n = 82).*

	n (%)
The constant emphasis of public sources of information on prevention of pregnancy	27 (33%)
It was expected that health, fitness or family history are indicators of personal births	38 (46,3%)
Messages from media, friends or colleagues mislead them regarding age and reproductive capacity	24 (29,3%)

Table 5. — *Infertility duration*

Infertility duration	Total (n = 82)	The number of women who planned the first pregnancy	
		up to 35 years (n = 56)	older than 35 years (n = 26)
Up to one year	1 (1.2%)	0	1 (3.8%)
1-3 years	10 (12.2%)	2 (3.6%)	8 (30.8%)
4-5 years	14 (17.1%)	7 (12.5%)	7 (26.9%)
6-9 years	25 (30.5%)	17 (30.4%)	8 (30.8%)
10-14 years	27 (32.9%)	25 (44.6%)	2 (7.7%)
More than 15 years	5 (6.1%)	5 (8.9%)	0

Table 6. — *Retrospective assessment of awareness as a factor influencing the decision-making process of procreation.*

	Number of women n = 82 (100%)	The number of women who planned the first pregnancy	
		up to 35 years n = 56 (100%)	over 35 years n = 26 (100%)
It is necessary to address young women and men in media regarding fertility	80 (97.6%)	54 (96.4%)	26 (100%)
It is necessary to carry out testing fertility of men and women at any age	77 (93.9%)	53 (94.6%)	24 (92.3%)
I would try to conceive a child earlier, having necessary information	66 (80.5%)	40 (71.4%)	26 (100%)
Personal circumstances prevented earlier conception regardless the information of increased risk for infertility with age	8 (9.7%)	1 (1.8%)	7 (26.9%)

physician or other specialists. Thus, it can be assumed that not only patients have knowledge on which specialist to address and when to apply for infertility, but also on their doctors at the primary care level.

After consultation with the reproductive health specialist, most women did not expect they might need ART for their conception (including donor programs), and 44 (53.7%) reported they were “shocked” with the information they received.

Fifty-three (64.6%) participants first learned that even IVF offers them a limited chance of success, suggesting that modern technology can guarantee the birth of a child. Women who applied to the present clinic for the first time received information about their ovarian reserve and the danger of its reduction with age.

After the advice received from the reproductive health expert, 79% of women said they were happy that they turned to this specialist and were ready to try their chances in IVF, including the program with donor eggs (32%). Virtually all women (97.6%) advocated the use of data in the media that reduce fertility, so that men and women assess their risks and make more informed decisions regarding the timing of their first child’s birth (Table 6).

Practically all the patients interviewed by the authors (93.9%), supported the idea of regular screening of women and men for fertility, included at the state level. 80.5% of the respondents indicated that they could attempt to conceive at an earlier age if they had more detailed information about the decline in fertility. Typical applications included: “Maybe I’d just try to be more serious about finding the right guy sooner” or “We can temporarily suspend our careers, but we cannot return lost time for the birth of our children, and I never assumed how serious it was”. Only 9.7% of women admitted that, even if they had the necessary information, their life circumstances would not allow them to give birth earlier. The arguments of this group of women were as follows: “I was too young to understand the risks of infertility” or “I was simply not ready to have a family and children”.

## Discussion

The impressive rise in the mean age at maternity in recent decades at a global level is the result of postponing the first (and subsequent) births rather than a rise in fertility at later ages. Age of women markedly influenced the results of the

so called ‘traditional’ treatment of infertility (i.e. those available before the era of assisted reproduction) and pregnancy rates were significantly lower in women over 35 years of age as compared with younger patients. Similarly, there is also a marked age-related decline in success rates when using modern ART for treatment of infertility. In spite of that, many studies have shown women both underestimate the role that age plays in fertility and overestimate the ability of ART to compensate for reduced fertility at older ages [7].

Analyzing the sociological characteristics of infertile women addressed to us at the age of 40-49 years, the present authors noticed that they were mainly women of indigenous nationality (61%), married (85.3%), mostly legally (57.3%), who had a higher education (86.6%) including academic degree (2.4%).

Despite the existence of higher education, most women did not have a clear idea of the age, when the physiological ability to procreate begins to decline. More than half of the participants were “shocked”, discovering that the chances of conception at their age were much lower than they expected. Every third of the women who turned to infertility began planning their pregnancy only after 35 years. Among the main reasons for late planning were: later marriage, lack of a sexual partner, the desire for career growth, graduation, lack of housing, money, etc.

It can be assumed that the socio-demographic phenomenon of delayed procreation still takes place in Kazakhstan and reflects the cultural, physical, and economic realities of our time.

Women who planned their first pregnancy before the age of 35 (68.3%) years, but who did not give birth at the time of going to the clinic, explain this fact with the available medical problems, and the lack of knowledge about the predictions of their fertility.

In the meta-ethnography article written by Cooke *et al.* [8] three groups of women were determined according to the degree of decision-making about the terms of procreation: (i) those who were uninformed, (ii) those who believed that they had been informed but had incomplete information, and (iii) those who were informed, but nevertheless delayed procreation. In the present study, like the first group of Cooke *et al.*, 39% of the participants reported that they were completely unaware of age and fertility. The remaining 61% of women knew that fertility was declining after 40 years, but they believed that the ability to bear childbearing persists until menopause. The age of menopause, in their opinion, varied on average from 45 to 55 years.

It is interesting that in the group of women consciously postponing their motherhood, the number of those who are aware is almost 2.5-fold less. This underestimation of the effect of age on fertility correlates with the results of other surveys of European and Canadian students who were asked to consider the dependence of fertility on age at an

earlier stage of their life [9-12].

The question arises, why do highly educated women decide on the birth of a child so late? One-third (33%) of women in the present study emphasized that throughout life, emphasis is placed on the prevention of pregnancy, which may have contributed to a reassessment of their chances of conception even at a late age. The standpoint that controlling birth-pregnancy prevention creates the “illusion” of controlling fertility was described [13].

In the present study 46.3% of the women corresponded to the second group of cited authors [8] who believed that the information did not apply to them personally because of misleading information from the media, their own healthy lifestyle or because of the family history of fertility. This distortion of information regarding the relationship between age and fertility can also be seen as a reflection of the growing cultural tendency to shift personal guilt for infertility to external factors [14].

It would be fair to note that the scientific recognition of the fact that fertility decline with age is also relatively slow. In the report of Centres d'Etudes et de Conservation des Oeufs et du Sperme (CECOS) Federation in 1982 in France, the first large-scale study was conducted to draw attention to the decline in the effectiveness of IVF in women of older reproductive age [15].

Considering the decrease of ovarian reserve with age, women who had reached the age of 35 were encouraged to address the reproductive endocrinologist and IVF specialist, bypassing other treatments. Over the past years the demographic trend of delayed childbearing has continued, as has the increasing demand for ART in women older than 35 years. Recent demographic projections indicate that even widespread use of IVF will compensate for only a small part of the birth deficit [16]. In fact, the present authors found that all respondents advocated improving education for fertility at an earlier age to enable women to make family-planning decisions appropriately, and on time. The present findings reflect the results of other studies showing that women have a common understanding of aging and fertility, but they do not have accurate or specific knowledge that could contribute to making informed decisions about their timing of childbearing [14, 17].

Practically all of the patients interviewed in this study supported the idea of regular screening of women and men for fertility, which coincides with the results of another survey concerning the attitude of women to have their ovarian reserve assessed [18]. However, it should be kept in mind that women deliberately postponing procreation can be informed, but not ready to raise children because of competing demands for education, work, and obtaining material benefits [19, 20]. Among the participants in this study, this category of women was 9.7%, which is substantially less than in other studies.

The present authors recognize that in this work they only collected data from the category of women who consulted



for assistance to the National Science Center and may not reflect the average statistical sample of the population of the whole country. Therefore, the present authors intend to continue their studies specifically designed to evaluate awareness. Nevertheless, the very fact that the participants were highly-educated and with a financial level above the average makes their relative lack of knowledge and awareness of age-related infertility more significant. Perhaps, it was indeed education and a high socio-economic status that caused a greater concentration of attention on contraception than on fertility, on a career, and achievement of material wealth, against the choice to have children at a younger age.

## Conclusions

Infertile women over the age of 40, before consulting with a reproductive health specialist, did not fully understand the influence of age on fertility. After consulting a specialist, they advocated better public information about the risk factors for infertility. Additionally, they advised fertility testing of men and women of all ages, especially young people to obtain better insight into their "biological reserve" and to correct their family plans accordingly. Only a small number of respondents admitted that their personal life circumstances would not have prompted them to begin procreation before it occurred. Thus, it is necessary to inform the population from adolescence through the media and doctors, not only about the dangers of abortion and timely contraception, but also about the risks of infertility. It is mandatory to include in the training program of general practitioners information on the relationship between age and fertility, thus educating them to have an attitude to prevent infertility.

While later motherhood is not a new social practice, it is unique that an increasing number of women become pregnant with ART and often for the first time at the end of their reproductive cycle. Additionally, the present authors can conclude that maternity at an older reproductive age in the near future will be one of the factors contributing to a steady change in society's views on the issue related to the term "what is the old age". These are women of new reproductive behavior, that respond to the changing social, cultural, psychological, and economic realities of the times.

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Corresponding Author:

M. TERZIC, M.D., PHD, OBGYN  
Nazarbayev University, School of Medicine  
5/1 Kerey and Zhanibek Khans Street  
NUSOM building office 904/9  
Astana, 010000 (Kazakhstan)  
e-mail: terzicmilan@yahoo.co.uk