Childbearing, the desire to have children, and awareness about the impact of age on female fertility among Finnish university students

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ABSTRACT
Objective To describe Finnish university students’ childbearing histories, desires concerning childbearing, and awareness regarding the impact of age on female fertility.
Methods A national survey of Finnish university students in 2008. A questionnaire was sent to 9,967 Finnish undergraduate university students aged less than 35 years. Altogether, the questionnaire was answered by 1,864 men and 3,222 women. The overall response rate was 51% (42% for men and 59% for women). Students were asked about their number of children, desired childbearing, and awareness of the effect of age on female fertility.
Results Of the respondents, 8.25% had children, and 94.0% wanted to have children in the future. Female students were more aware of the impact of age on female fertility than were male students. Over half of the men and approximately one-third of the women thought that the marked decrease in female fertility begins after the age of 45 years.
Conclusions A vast majority of Finnish university students wanted to have children in the future. Their awareness of the natural, age-related decline in female fertility was insufficient. Sexual health education in schools and health care personnel’s family planning counselling, for both men and women, should include information about the age-related drop in fertility.

KEYWORDS Age; Childbearing; Desire to have children; Fertility awareness; University students; Finland; National survey; Maternal age

INTRODUCTION
Postponing childbirth has become common in Western countries; this has resulted in an increasing number of pregnancies in women over 35 years old and has contributed to the decline in the total fertility rate1–4. In Finland, the mean age of parturients was 30.1 years in 2009, and women aged 35 and over accounted for 18.7% of all parturients5. The Finnish total fertility rate recovered somewhat in the 21st century and was 1.86 in 20096. The same trend has been observed in recent years in other European...
countries, such as Sweden, Estonia, the Czech Republic, and Spain. However, almost all European countries remain well under the replacement level\(^1\).

Female fertility declines with advancing age\(^5,6,9\), and the reproductive phase in women is relatively short in comparison to their entire lifespan. Whereas male reproductive function is maintained – with only a slight decline – until old age, the reproductive function of the ovaries lasts only from menarche until menopause. Although the exhaustion of follicles at menopause marks the definitive end of the female reproductive capacity, female fertility actually begins to decrease many years before menopause. More specifically, female fertility declines slightly and gradually toward the end of the third decade, most significantly from approximately 32 years onwards, and much faster after the age of 37 years\(^5-9\).

Originally, knowledge about the impact of age on fertility was based on historical data concerning populations which did not apply contraceptive measures\(^3,8-10\). More recently, studies about the treatment of infertility have provided additional data\(^9-12\).

To some degree, there is individual variation in female reproductive ageing, which is determined mainly by genetic factors\(^12\). However, all women show a natural decline in fertility by the age of 40 years. Furthermore, advanced maternal age can adversely affect the outcome of a desired pregnancy and cause health problems in both mother and child\(^10\). There is an increased risk of chromosomal abnormalities, especially aneuploidies, which may contribute to the greater incidence of spontaneous abortions in the latter part of a woman’s reproductive period\(^6,13\).

Delayed childbearing has become increasingly socially acceptable, and a considerable amount of favourable media attention has been given to older mothers\(^2,14\). Current advances in assisted reproductive techniques (ART) may have caused misconceptions about the possibility of manipulating female fertility at will\(^2\). Yet none of these advances can fully compensate for the age-related decline in female fertility\(^9,11,12,15\).

Women with higher education, particularly, tend to postpone pregnancy\(^16\). The age of university students in Finland is relatively high compared to that of university students residing in other European countries\(^17\). Previous studies have shown that having yet to obtain a university degree is the main reason for the postponement of pregnancy and delayed childbearing, which are achieved by the efficient use of contraception\(^18,19\).

A survey of Swedish students conducted in 2004 revealed insufficient awareness about the age-related decline in female fertility\(^16\). Other studies from Canada and the United Kingdom have shown that young women had little knowledge of the potential consequences of delayed childbearing\(^20,21\).

No prior research on the awareness of students about the influence of age on fertility has been conducted in Finland. The aim of this study was to investigate university students’ childbearing histories, desire to have children, and awareness of the impact of age on female fertility.

MATERIALS AND METHODS

The data in this study were derived from a national health survey conducted in 2008 among Finnish university students\(^22\). This thorough survey investigated Finnish university students’ health and health-related behaviours. The 141 questions were divided into special themes, one of which covered sexual health. The study protocol was approved by the Medical Ethics Committee of the Hospital District of Southwest Finland, and the participating students voluntarily gave their informed consent by responding to the questionnaire.

The study population comprised 282,049 subjects and consisted of Finnish undergraduate university students who were less than 35 years of age. Of this number, 54% studied at science and art universities and 46% at universities of applied sciences (formerly known as ‘polytechnics’). In Finland, the proportion of foreign students is small (4–5%), and these students were excluded from the target group. A random sample of 9,967 students, of whom 45% were male, was drawn from the study population. For students at science and art universities, a random sample was drawn and stratified by location. For students at universities of applied sciences, the sampling was stratified by school. Representativeness was ensured by comparing the sample and responders with registry information (Finnish Student Health Service Registry and Statistics Finland). The respondents were representative of the study population with respect to gender, age, university, and field of study.

The responses were collected by post, although completion of the questionnaire over the Internet was also possible. It was re-sent three times, once in paper format and twice electronically. Altogether, the
The questionnaire was answered by 1,864 men and 3,222 women. Of the respondents, 3,173 answered by mail and 1,932 answered via the Internet. The overall response rate was 51% (42% for men and 59% for women).

**Questionnaire**

Most questions were structured, but there were also some open questions. The questionnaire gathered information about current pregnancies, the number of children, and the desired number of children. Respondents who were childless but desired to have children in the future were asked at what age they wished to have their first child. Students were also asked about sexual relationships, current use of contraception, and if they had an induced abortion. The questions concerning the impact of age on female fertility were similar to some of the questions that the Swedish researchers Lampic et al. used in their study concerning fertility awareness among university students16:

1. At what age is there a slight decrease in a woman's ability to become pregnant?
2. At what age is there a marked decrease in a woman's ability to become pregnant?
3. If a man and a woman regularly have unprotected intercourse during a period of one year, how high is the chance (%) that the woman will become pregnant if she is:
   a. 25–30 years old?
   b. 35–40 years old?

An open response format was used for these questions. The answers were categorised into five-year age groups. In this study, we defined the slight fertility decrease to be between the ages of 25 and 29 years and the marked decrease to be between the ages of 35 and 39 years. The chances of a woman conceiving during one year at the age of 25–30 years or at the age of 35–40 years were defined to be 80–89% and 50–59%, respectively. These definitions were established according to published data5–9.

**Statistical methods**

The data are presented with frequency distributions, cross tabulations, and descriptive statistics. Differences between genders in categorical variables were tested with the Cochran-Mantel-Haenzel test, which was stratified by age group to control for the potentially confounding effects of age. Continuous numerical variables were compared using t-tests. The respondents’ perception of the ages of slight and marked decreases in female fertility were analysed using a two-way analysis of variance model with age group and gender as explanatory variables.

**RESULTS**

The mean age of male respondents was 24.7 years and that of female respondents was 23.9 years; 39.6% of the men and 45.0% of the women lived with a partner or with a partner and children.

**Childbearing and desire to have children**

Over half of the students were in a stable sexual relationship (Table 1). The percentage of childless students was 92.2% for males and 90.4% for females. The vast majority (94.0%) desired to have children in the future.

The median desired age to have a first child was 28 years among females and 30 years among males (p < 0.001). Two-thirds of female students and 42% of male students wanted their first child between the ages of 25–29 years (Table 2).

**Fertility awareness**

Women were significantly more aware of the age-related drop affecting female fecundity than men were (p = 0.001) (Figure 1). More than half of the men and about one-third of the women thought that the marked decline in female fertility begins after the age of 45 years.

The perception of the age at which female fertility is markedly reduced was also analysed by age group (Table 3). For both genders, the proportion of respondents with a correct perception of the impact of age on female fertility was the smallest among younger respondents (p = 0.001).

More than half of males and 43% of females overestimated a couple’s chance to conceive during one year of unprotected intercourse at the age of 35–40 years (Figure 2). Concerning this issue, women were better informed than men (p = 0.001), and older
respondents had greater awareness than younger ones ($p = 0.041$).

Almost half of the 30–35-year-old male participants and 40% of the 30–35-year-old female participants overestimated the chance of a woman becoming pregnant between the ages of 35 and 40 years (Table 4).

**DISCUSSION**

This study reveals a serious lack of awareness among participants concerning the natural, age-related decline in female fertility. Considering the high level of education of the population assessed in the present study, it is astonishing that the level of overall fertility...
awareness was so poor. Particularly alarming in our study is the lack of awareness among male students and younger respondents, and the belief among one-third of men and one-fifth of women that female fertility decreases markedly only after the age of 50 years.

The present study has several strengths. It was the first national survey of awareness about the impact of age on female fertility among students, a topic that has also not been studied among the general population in Finland. The present sample was part of the large original Student Health Survey 2008, and it was nationally representative with regard to major demographic characteristics. There are also limitations in a survey of this type. The questionnaire was extensive and, inevitably, not all respondents answered every question. As the response rate was good among female students, the study results can be considered to reliably reflect their opinions. The results concerning male

Figure 1 Perception by gender of the age for slight and marked decreases in female fertility among Finnish university students in 2008. \( n = 1782 \text{ men, 3149 women}; n = 1792 \text{ men, 3148 women.} \) The effect of gender was highly significant for both variables \((p < 0.001)\) using 2-way ANOVA. The categories defined as slight and marked decreases in this study are in parentheses.

Figure 2 Perception by gender of the chance for a woman to conceive at the age of 25–30 years and at the age of 35–40 years when having regular sexual intercourse without contraception during one year (%). \( n = 1784 \text{ men, 3069 women; } n = 1781 \text{ men, 3063 women.} \) The effect of gender was highly significant for both variables \((p < 0.001)\) using 2-way ANOVA. The categories defined as the correct answers in this study are in parentheses.
students, whose response rate was less satisfactory, should be interpreted with caution.

For the fertility awareness questions, we could have used other cut-off points for correct answers, but even then the results would not have been significantly different. It is possible that the sheer size of the questionnaire caused some study participants to intuitively think of the age of menopause when they answered the question about the age of marked decrease in female fertility.

Our results are in line with those of Lampic et al., that is, almost all students wanted to have children in the future, but their level of awareness regarding age and fertility was even poorer than that among the Swedish students assessed by the aforementioned authors16.
In this study, a sizeable proportion of students intended to have their first child at the age of 35 or over. Furthermore, certain age groups of respondents overestimated a woman’s chance of conceiving without contraception. Even if most female participants desired to have children before the age of 30 years, many of them had contemplated postponing parenthood to an age when female fertility is markedly decreased. A German survey of female academics indicated that many of those who were childless at the time of the survey merely intended to postpone motherhood. In addition, people may have false beliefs about how they can increase their fertility, as a study from the UK revealed.

University students are at the optimal age for childbearing, but have many reasons to postpone this important event. A qualitative study among emergency contraception seekers revealed that most students wanted to have their first children after their studies were completed. Other reasons were the casual nature of their current relationship and their belief that they were 'not mature enough for motherhood'. The same reasons also emerged as important in a study among Swedish students.

The prevention of infertility is as important as that of unwanted pregnancies. Sexual education in schools should include information about the age-related declines in fertility. The media could contribute by creating a more positive atmosphere to encourage people to have children within the optimal age range of 20–35 years. Additionally, it would be desirable for political decision makers to consider the medical risks of delaying childbearing. Postponement of the first birth varies strongly according to the social background and is most common among highly educated women. Informed choices about the timing of parenthood are possible only if people are aware of the risks of delayed childbearing. One task of health care personnel is to properly inform students of both genders about the effects of ageing on reproductive function. It remains to be determined what interventions would best increase awareness among students and how awareness would shape individual choices.

CONCLUSIONS

In this study, few Finnish university students had started a family, but 94% wished to have children in the future. Their awareness about the natural age-related decline in female fertility was insufficient, and they overestimated the chances of having children at an older age. Sexual health education in schools and health promotion for adults should include information about the age-related declines in fertility.

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REFERENCES


