

## CAUSES OF INFERTILITY IN WOMEN AT REPRODUCTIVE AGE

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### Abstract

Infertility is a global health issue affecting approximately 8-10% of couples. It is a multidimensional problem with social, economic and cultural implications, which can take threatening proportions in countries with strong demographic problems, such as Greece. Lately, an increasing number of couples with infertility problems choose the artificial insemination. The purpose of the study was to investigate the causes of infertility in women of reproductive age.

**Material and Method:** The study population consisted of 110 infertile women who sought medical help in a private Assisted Reproduction Center for a period of 2 months. Collection of data was performed by means of a specifically designed questionnaire, which apart from the demographic data, it included questions concerning the causes of infertility.

**Results:** The sample studied consisted of 110 infertile women. Regarding marital status 94.4% (106) of the participants were married and 3.6% (4) unmarried. Regarding age, 64.5% were 20-29 years old, 20.0% were 30-39 years old, 11.8% were 40-49 years old and 3.7% were over 50 years old. As to occupation status, 35% of the participants were employees in the private sector, 27% were employees in the public sector, 24% were self employees and 14% dealt with the household. Regarding educational status, 3.6% had finished primary school, 31.8% had finished high school, 56.4% were University graduates and 8.2% were graduates of another school.

Concerning the causes of infertility, 27.4% of the problems were due to fallopian tubes dysfunction, followed infertility of «unknown» cause in 24.5% of the cases, 20% were due to disorders of menstruation, 9.1% due to problems of the uterus, 2.7% due to sexual disorders, another 2.7% because of age and in a very small percentage, infertility was caused by ovarian failure. Regarding the daily habits of the participants, 45.5% were smokers. **Conclusions:** The causes of female infertility are problems in the fallopian tubes and the uterus, disorders of menstruation, sexual disorders, age and ovarian failure. Female infertility is a complex problem that should be considered carefully by the government and stakeholders in each country and especially by those countries with demographic problems, in order to find effective interventions and solutions.

**Keywords:** infertility - female reproductive age - causes of infertility

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## Introduction

Childbearing and raising of children are extremely important events in every human's life and are strongly associated with the ultimate goals of completeness, happiness and family integration. It is widely accepted that human existence reaches completeness through a child and fulfils the individual's need for reproduction. Human fertility, compared with other species of animal kingdom, is unfortunately low.<sup>1-4</sup>

According to recent studies by the World Health Organization (WHO), approximately 8-10% of couples are facing some kind of infertility problem. Globally, this means that 50-80 million people are facing the problem of getting an integrated family. In the USA, approximately 5 million people have infertility problems, while in Europe the incidence is estimated around 14%.<sup>1-4</sup>

The incidence of infertility is associated with geographic differences. For example, in some west-African communities infertility rate is around 50%, while in some western European countries is 12%. Likewise, differences are observed both in developed countries, where rates range from 3.5% to 16.7%, as well as in less developed countries, where rates of infertility range from 6.9% to 9.3%. It has also been observed that the causes are related to geographical differences. Especially in Western countries, the most common risk factor of infertility is age, while in Africa is sexually transmitted diseases.<sup>1-4</sup>

Infertility is defined as the inability of getting pregnant after trying for at least 6 months or one year, for women over 35 years old, without use of birth control means and while having normal sexual intercourse. Assisted reproduction includes all the methods used for fertilization, which is not achieved through sexual intercourse.<sup>5</sup>

In the past, people had little control over their fertility and couples that could not get a child had no other choice but to accept the fact. In contrast, although today infertility is a relatively common problem that touches deeply the soul of couples involved in this, medical science has increased the chances of

giving solutions to the problem with the Assisted Reproduction.

The first successful fertilization of human eggs in the laboratory was in 1978. The fact of the first child-birth by this process was a real milestone because it gave hope to the infertile couples as it offered a possible solution to the problem. Furthermore, in the USA, the first successful childbirth in 1981 through Assisted Reproduction led to rapidly increasing application of this method and the creation of specialized centers.<sup>5-6</sup>

The purpose of this study was to investigate the causes of infertility in women of reproductive age.

## Material and method

The study population consisted of infertile women who sought medical assistance to a private Center for Assisted Reproduction and were selected by random sampling method. For data collection, a specially designed questionnaire for the purpose of the research was used. The questionnaire included both the demographic characteristics of the population and questions regarding the causing factors of infertility. The data collection lasted for two months.

The type and the wording of questions were carefully selected in order to preserve the anonymity of the participants and create confidence.

The statistical program SPSS 13 (Statistical Package for the Social Sciences) was used for the data analysis.

## Results

The studied population consisted of 110 infertile women.

Regarding age, 64.5% of the 110 women coming to the center of the Assisted Reproduction and agreeing to participate were 20-29 years old, 20.0% were 30-39 years old, 11.8% were 40-49 years old and 3.7% were above 50 years old. Regarding family status, 94.4% (106) of the women were married and 3.6% (4) were single. The last ones were addressed in Assisted Reproduction not because of a specific gynecological problem that wouldn't

allow them to have children, but because they wanted to have children with the use of artificial insemination.

Regarding educational status, 56.4% of the participants were university graduates or graduates from technical institutions, 27.3% were high school graduates, 8.2% were graduates from different institutions, 4.5% were gymnasium graduates and 3.6% were primary school graduates.

Table 1: Distribution of the sample- study according to the demographic characteristics.

	N	%
<b>AGE</b>		
20-29 years old	71	64,5
30-39 years old	22	20,0
40-49 years old	13	11,8
<50	4	3,7
<b>OCCUPATION</b>		
Private employee	39	35,5
Public employee	30	27,3
Household	15	13,6
Self-employee	26	23,6
<b>RESIDENCE</b>		
Islands	7	6,4
Central Greece	87	79,1
Northern Greece	13	11,8
Peloponnesus	3	2,7
<b>FAMILY STATUS</b>		
Married	106	96,4
Not-married	4	3,6
<b>EDUCATIONAL STATUS</b>		
Primary education	4	3,6
Secondary education	35	31,8
Tertiary education	62	56,4
Other school	9	8,2

The results of the present study showed that the most common cause of female infertility was problems in the fallopian tubes in 27.4% of the cases, while the second most common cause was the infertility by « unknown causes», in the 24.5%.

53.6% of respondents with infertility of «unknown cause» had made several attempts of Assisted Reproduction.

The third most common cause was disorders of menstruation in the 20% of the cases, following infertility due to problems in the uterus in the 9.1% of the cases. Finally, in 2.7% of the participants infertility

Regarding the profession of the study population, 35.0% were employees in the private sector, 27.0% were employees in the public sector, 24.0% were self-employees and 14.0% dealt with household.

Regarding residence, 79.1% of the couples lived in Central Greece, 7.0% in the islands and 3.0% in Peloponnesus. (Table 1).

was due to age, an additional 2.7% due to sexual disorders and the last cause was the ovarian failure, which was common for the majority of the women tested. (Table 2).

None of the women who responded to our questionnaires was facing cervix problems.

As to the habits of the participants, 45.5% were smokers and 54.5% non-smokers. (Table 3).

**Table 2:** Distribution of the sample- study according to the causes of infertility.

Causes of infertility	N	%
Disorders of menstruation	22	20,0
Problems in the fallopian tubes	30	27,4
Problems in the uterus	10	9,1
Problems in the cervix	-	-
Sexual disorders	3	2,7
Ovarian deficiency	4	3,6
None	11	10,0
Unknown Cause	27	24,5

**Table 3:** Distribution of the sample- study according to the habit of smoking.

SMOKING	N	%
Yes	50	45,5
No	60	54,5
Total	110	100

## Discussion

According to the literature, infertility seems to be a multidimensional health issue which occurs not only due to health problems related to the fallopian tubes, the ovaries, and the endometrium, but it may also be a result of the choices imposed by the modern lifestyle, like the higher average age of people who get married, stress, non-conductive legal framework for assisted reproduction, etc.

The results of the present study showed that a high proportion of women aged 20-40 years took part in a program of assisted reproduction, possibly because this is the reproductive age period among women. However, it should be noted that, statistics in Greece show that it is mainly older women who participate in Assisted Reproduction.<sup>1,7</sup>

It is widely accepted that during the last twenty years, the average age of having children has increased and this is a key factor for infertility. As the age of giving birth is increased, the reproductive capacity is decreased, the ovary becomes less efficient, the frequency of sexual intercourse is decreased and the possibility of chromosomal abnormalities and miscarriage is increased.<sup>1,7</sup>

The results also showed that the majority of women who took part in the

study were employees in the public or the private sector. One possible interpretation of the finding is that women who work, are in daily contact with other people, exchange ideas, are well informed and receive various stimuli in the working environment, which makes them face the assisted reproduction in a more positive way. As a matter of fact, the general changes in women's belief and view about their role in modern society, makes it easier for them to ask help in an Assisted Reproduction center. In addition, the entry of women in the professional arena, the high professional competition, and the effort to obtain a comfortable life and financial security are important factors that lead to a delayed childbearing. Specifically, women who have very high career goals, often try to delay pregnancy by using contraceptives for very long time, which unfortunately have negative effects in a couple's fertility. Finally, the daily stress and the new high-demanding way of living have adverse effects on the reproductive capacity.<sup>8-15</sup>

Regarding educational level, the largest proportion of the participants who were in a program of assisted reproduction was high school or University graduates. According to the literature, age and demographic factors such as socio-economic status and education, are positively associated with seeking help in Assisted Reproduction centers. More in

detail, women with higher income and educational level, as well as those who have insurance coverage, are subjected more often to Assisted Reproduction treatments compared to those who have a lower income. Specifically, couples that have low income are forced to seek help after several non-successful physiological attempts, because of the high cost of the treatment or the small insurance coverage. However, this entails loss of valuable time and direct inclusion in a particular program applied to women of an older age.<sup>14, 17-22</sup>

Unfortunately, until now in Greece, inadequate insurance arrangements for the treatment of infertility and the rudimentary refund that is given to the patients, has made it very difficult for the women to try one of these possible treatments. According to the law in Greece, all public insurance companies are obliged to provide a small amount of money, approximately 360 euros for each Assisted Reproduction attempt. Overall, the number of attempts that a woman can make after the approval from the insurance company does not exceed four, and the time between attempts varies from three to four months, depending on the company.<sup>23-24</sup>

The largest proportion of couples in this study lives in Central Greece. One possible explanation for this finding is that women prefer centers of Assisted Reproduction in large cities, away from their residence, because they think that they will be of a better treatment and they will ensure privacy and medical confidentiality. Due to lack of official control committee for the quality of the Assisted Reproduction centers, special attention is required, because the selection of the applied methods and the control of their effectiveness are not always feasible. The process of defining the criteria for granting operating licenses to these centers is also crucial. Each center should have the necessary infrastructure, as well as highly trained medical and nursing staff in order to meet each couple's need.<sup>17-22</sup>

The fact that the majority (96.4%) of the women in the study are married, shows that having children within marriage is a powerful institution in Greece. Another possible explanation is that the diagnosis of

infertility, and thus the discovery of the problem, becomes perceptible only when the women get married and decide to have children. Apart from the married women, there were 4 single women, who had visited one of the Assisted Reproduction centers without having an infertility problem. Their hope was to have children with artificial insemination, where fertilization is achieved with sperm from donors. This method has been applied in Greece for several decades, but the results are not known, at national level at least, because most of the centers are private and do not show their data to the National Statistical Service.<sup>24</sup>

In many parts of the world there is a strong social and religious opposition to the selection of artificial insemination as a method of child-bearing. Some years ago, the use of donor sperm was considered as a condemnable act contrary to the ethical concepts of the Greek and some European societies. Today though, it is regulated by several European legislations. According to the literature, it is mainly single or women of an older age that choose this method, a conclusion that is in line with our findings. Results from a recent study in Denmark showed that 1/3 of the sperm donors had a positive attitude towards artificial insemination for women without a partner but then, the motivation of the donors was mainly economic. Similarly, positive attitude towards artificial insemination for women without a partner was found from a study carried out in Greece, in which approximately 50% of the participants were ready to donate or accept donation of sperm. The anonymity of the donor has been the subject of many investigations, which concluded that the notification of their identity is a key factor of sperm donation. In Greece, there are private sperm banks, which may ensure anonymity and financial benefits to donors, but are not controlled as to the origin of semen. Therefore, specific legislation is necessary for the establishment and operation of sperm banks.<sup>25-33</sup>

As for the causes of female infertility, these relate mostly to the hypothalamus, the pituitary gland, the ovaries, the fallopian tubes, the body of the uterus, the cervix of the uterus and the vagina. Both the

anatomical and functional adequacy is essential for successful conception.<sup>34</sup>

The conclusion from the participants' responses was that problems related to the tubes are the primary cause of female infertility and then follows the «unknown cause».

The main cause of infertility related to the fallopian tubes is any condition affecting the normal function and anatomy of the fallopian tubes and prevents the meeting of sperm with the ovum and the consequent conception. The development of ectopic intrauterine tissue occurs mainly in women aged 30-40 years old and is called "disease of high social class" because it occurs more often in advanced countries. This specific condition is more common among the women that have given birth many times before and those that give birth in an older age. Finally, the use of contraception methods, such as intrauterine spirals, can sometimes contribute to infertility because they can cause inflammation and destruction of the fallopian tubes.<sup>35, 36</sup>

Although the most important step in the Assisted Reproduction is investigating the cause of infertility, in this study, it was observed that 10.4% did not know the cause of infertility. The failure to identify a clear cause of the infertility after a full screening of both partners is defined as infertility of «unknown cause».<sup>34-38</sup>

In the present study, 20% of the infertility was due to menstrual disorders, which often occur as a result of metabolic diseases. It is known that the function of the thyroid gland is directly affected by the relationship of hypothalamic-pituitary gland-ovarian hormones. The increased function of the thyroid is likely to cause disorders in menstrual cycle, and an increase or decrease in women's sexual activity, while the decreased function of the gland causes a decrease in sexual activity, and/or increased flow during menstruation, bleeding of the uterus, and more rarely secondary amenorrhea. Also, neoplasms may be the cause of thyroid dysfunction, and disorders in the pituitary gland may cause decreased function of the thyroid. Finally, changes in the menstrual cycle can occur under stress conditions.<sup>34-38</sup>

The second common cause (9.1%) of infertility was problems in the uterus. The main problems that are related to the body of the uterus and cause infertility are malformations, abnormal positions of the uterus, inflammation, intrauterine symphysis, atrophy of the endometrium, and malignant neoplasm.<sup>34-38</sup>

Four women had experienced ovarian failure. The main cause of infertility related to the ovaries is inability of ovulation, a condition where the release of the egg is for some reason prevented. Other common problems are inflammation of the ovaries, endometriosis, polycystic ovarian syndrome and neoplasms. Also, infertility may be associated with impairment of luteal phase where after ovulation, the fertilized egg is not possible to be implanted in the uterus.<sup>34-37</sup>

According to our results, sexual disorders are the cause of infertility in a percentage of 2.7%. Sexual disorders may be a result of the above mentioned health problems or follow problems in the couple's relationship.

Besides the health problems related to the female anatomy, another major factor that causes infertility is smoking. The harmful effects of smoking on health, during the reproductive age of men and women, have started to be investigated during the last 20 years. Several studies have highlighted the harmful effects of active and passive smoking on fertility, in women of reproductive age, as well as a significant reduction in the possibility of a successful outcome after assisted reproduction attempt. While smoking is one of the main causes of infertility and most of the population in Greece is aware that has many negative consequences, about half of the female population smokes regularly, and only 20% of these considers to quit smoking.<sup>38-42</sup>

Other causes that are likely to cause infertility, but not explored in this study, are: diseases affecting the function of the ovaries, dietary problems such as excessive increase or decrease in body weight, exposure to radiation, chemical agents, cytotoxic drugs, orgasm disorders and psychological causes.

## Conclusion

Childbearing and family are considered a right of every human being. Infertility is a health problem that requires appropriate treatment strategy. Modern medical science has developed advanced therapies to assist reproduction over the last 20 years. The main causes of female infertility are the problems of the fallopian tubes, disorders of menstrual cycle, problems in the uterus, sexual disorders, age, ovarian failure, and other unknown causes.

The Greek state must try to understand the problem of this portion of the population and show interest, in order to allocate the necessary resources to solve it. The medical and socio-economic support of infertile women, which means easier access to medical services, higher insurance coverage, broader social support, and information are important requirements for resolving the problem.

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