Iranian Journal of Reproductive Medicine Vol.7. No.3. pp: 117-122, Summer 2009

The epidemiological and etiological aspects of infertility in Yazd province of Iran

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Received: 24 February 2009; accepted: 17 September 2009

Abstract

Background: Infertility is defined as one year unprotected intercourse without pregnancy. It greatly affects couples' quality of life, and has great impact on their careers, everyday activities, sexual and non-sexual relationships.

Objective: To study the prevalence of both primary and secondary infertility and demographic characteristics of it in Yazd province.

Materials and Methods: We studied 5200 married defined couples in 260 randomized clusters. These couples were interviewed based on using a structured questionnaire. Then, for etiological evaluation, infertile couples were referred to the Research and Clinical Center for Infertility.

Results: Among these couples, 277 cases of infertility were encountered and the overall prevalence of infertility was 5.52% (95% CI from 4.9% to 6.1%). In total 170 couples (3.48%) had primary and 107 (2.04%) had secondary infertility. The prevalence of infertility in rural and urban areas was 5.3% and 6.8% respectively. Female factors were more common (57.5%) in etiologic assessment of infertility.

Conclusion: Our data showed a lower total prevalence of infertility in our people compared to the other countries. Furthermore, there was significant difference in infertility prevalence between geographic parts of the province. Female factors and among them ovarian disorders were the main cause of infertility in central part of Iran.

Key words: *Epidemiology, Etiology, Infertility, Yazd.*

Introduction

For millions of couples around the world the inability to have children is a personal tragedy. The accompaniment of personal, interpersonal, social, and religious expectations brings a sense of failure, loss, and exclusion to those who are infertile. Infertility has increased as a problem over the last 30 years all over the world, regarding to social phenomena, such as the tendency for marriage at a later age and child bearing, increasing use of contraception specially Intra Uterine Device (IUD) and liberalized abortion.

The incidence of infertility in a population has important demographic and health implications. It was estimated that infertility affects at least 14% of people in reproductive age (1), although the prevalence varies between regions and countries and its pattern is different in developed countries than those in developing regions of the world (2). So that, it was as high as 30 % in Sub Saharan Africa (3), about 12% in some European communities (1) and it was nearly 7.4 % in the United States (4).

For many couples, infertility and its treatment cause a serious strain on their interpersonal relationship, and cause disturbed relationships with other people, personal distress, reduced self-esteem, and periods of existential crisis.

There is no reliable data about the infertility rate in Iran except of limited regions like Shiraz with infertility rate about 11.1% (5) and West of Tehran with 12 % (6). Recently, Vahidi *et al* reported that the frequency of primary infertility in Iran is 3.4% (7). Because of the importance of infertility and its psychosocial and economic

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impact on the infertile couple, this community-based study in Yazd urban and rural regions was performed to measure the prevalence of infertility in men and women and to investigate its etiological factors.

Materials and methods

The random cluster sampling study was carried out in 10 areas of Yazd province, both rural and urban regions. In total 5200 married couples in 260 clusters were interviewed in 2004-2005. Couples with marriage times less than 12 months and non Iranian nationality were excluded. This study was conducted in two parts. In the first part, a sample population of 5200 couples was studied for the epidemiology of infertility and in the second part, 174 infertile couples were studied for the etiology of their infertility. In the first part of study, all consenting couples were visited at home and interviewed jointly by a trained field interviewer using a structured questionnaire. Couples demographic characteristics (age, education, job, monthly income, private home and car), date and outcome of reproductive events, contraceptive use episodes, fertility medical histories and familial marriage were obtained. In this study, infertility is defined as inability to conceived live birth after one year of unprotected sexual intercourse. Primary infertility describes couples who have never been able to become pregnant after at least one year of unprotected intercourse. Secondary infertility describes couples who have been pregnant at least once, but have not been able to become pregnant again. In the second part, all infertile couples in reproductive age (15-44 years) who were screened in first stage of study, were referred to Yazd Research and Clinical Center for Infertility. A complete history was taken and a complete physical examination was performed for all of patients. In the men, attention was paid to sexual and ejaculatory function, history of inguinal surgery, cryptorchidism, mumps, orchitis, testicular torsion, environmental or occupational factors and drug or medication intake. Systemic examination including secondary sexual characteristics, number and size of testes, thickness of epididym and vas deferens, inguinal examination, presence of scrotal swelling or varicocele and the other congenital or acquired malformations was performed for male partners. Specific investigations such as semen analysis, testicular or epididymal biopsy and hormone measurements performed for some cases by the order of specialist. Semen processing performed according to World Health Organization laboratory manual (8). Oligospermia was defined as a sperm concentration less than 20×10^6 mill/ml, asthenospermia was defined as sperm motility less than 50%, teratospermia was defined as normal sperm morphology less than 30% and azospermia confirmed when no sperm was seen in the semen. Testicular biopsy was done for azospermic patients with normal gonadotropin values. Hormone assay consisted of LH, FSH, prolactin and testosterone.

In the women, history of menstrual regularity, abdominal surgery, urinary tract infection, vaginal or nipple discharge, frequency of intercourse, dysparonia and drug or hormone intake, were determined. For physical examination, particular attention was focused on secondary sexual characteristics, any evidence of galactorrhea and virilization, vaginal or cervical abnormalities such as cervical stenosis and endometriosis. For clinical assessment of females, hormone assay tests, vaginal ultrasonography, hystrosalpingography, laparoscopy and karyotyping was performed in some cases by the order of specialist. Ultrasonography was done for documentation of ovulation. Tubal patency was assessed by hystrosalpingography. Hormonal assays consisted of LH, FSH, prolactin testosterone and TSH. Endometriosis and tubal adhesions were determined by laparoscopy. Karyotyping was performed in few cases.

This study was approved by the Ethical Committee of Research and Clinical Center for Infertility and was financially supported by Shahid Sadoughi University of Medical Sciences.

Statistical analysis

Data were analyzed with SPSS version 15 software. Chi-square test was used to compare differences in proportions. A p-value of <0.05 was considered for calculating statistical significance.

Results

A questionnaire survey was administrated to a sample population of 5200 couples from rural and urban regions of all 10 districts (administrative units) of the Yazd province. Participants were asked about their socio-demographic characteristics and reproductive history. Socio-demographic characteristic of the study population are shown in Table I. Of 5200 couples 277 couples (5.52%) had infertility. Of the 277 infertile couples, 170 had primary (3.48%) and 107 had secondary infertility (2.04%); but among secondary infertility group, some couples had

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positive history of primary infertility, so 333 (7.57%) had life time infertility. The mean age of the men was 45.35 ± 15.18 years (rang, 19-98 years) and the mean age of the women was 39.90±14.20 years (rang, 16-95 years). More (33%) men were in the age group of 50-59 years, whereas more women (28.2%) were in the age group of 30-39 years compare with the other age groups. The mean duration of infertility at the time of survey was 12.88 ± 13.05 years. The prevalence of infertility in urban regions was 6.8% and in rural population was 5.3%, the difference was not significant (p= 0.414) (Table II). The infertility rate had a significant positive correlation with educational level of women (p= 0.001), but it was not correlated with men education, job and socioeconomic factors of men and women. The prevalence of infertility increased with the marriage age of women and this was statistically significant (p= 0.007) (Figure 1). The infertility rate in couples with familial marriage was statistically different from couples with non familial marriage (6.3% Vs 4.7%) (p= 0.007); on the other hand, familial marriage was more common and significant in primary and secondary infertility (Figure 2). In total 3518 couples were in reproductive ages (15-44 years) and among them 220 couples were infertile (6.2%). In this group primary and secondary infertility was 3.9% and 2.3% respectively. We studied these groups and 174 of them completed evaluations for etiology of infertility and the most common cause of infertility was female factor (Table III).Of the 58 men with semen abnormality, 12 (20.7%) had azoospermia, 37 (63.8%) had oligoasthenospermia and 9 cases (15.5%) had asthenospermia alone.

The most common cause of female infertility was anovulation as polycystic ovary syndrome and it was identified in 67(58.8%) of infertile women by ultrasonography, hormonal assay and clinical manifestation. Tubal occlusion was the second most common etiologic factor and was identified in 28 (46.6%) women by laparoscopy or hysterosalpingography (HSG). Uterine factor was recognized in 9 women, these included 6 women with leiomyoma, 2 women with bicornuate or septate uterus, and 1 woman with Asherman's syndrome. Hyperprolactinemia was detected as a sole cause of infertility in 5 cases. One woman had both anovulation and tubal occlusion and one case was confirmed to have endometriosis.In 14 infertile couples, infertility was due to both male and female factors and in 16 cases the infertility evaluation yield normal results and the cause of infertility remained unexplained.

Table I. Socioeconomic condition and infertility.

Socioeconomic condition	No. of fertile couples (%)	No. of infertile couples (%)	Total (%)
Low	1957 (37.6)	116 (2.2)	2073 (39.9)
Middle	2594 (49.9)	142 (2.7)	2736 (52.6)
High	372 (7.1)	19 (0.4)	391 (7.5)
Total	4923 (94.7)	277 (5.3)	5200 (100)

Educational level: 0-6 Job: 0-2 Car: 0-1 Home: 0-5, Low level: 2-6 Middle level: 7-9 High level: ≥10, p= 0.753

Table II. Current prevalence of infertility in various regions of Yazd province.

	No. of infertile couples in Rural Area (%)	No. of infertile couples in Urban Area (%)	Total
Abarkooh	12 (4.6)	28 (10.8)	40 (8.7)
Ardakan	15 (5.8)	12 (4.6)	27 (4.8)
Bafgh	15 (5.8)	15 (5.8)	30 (5.8)
Khatam	7 (2.7)	10 (3.8)	17 (3.3)
Mehriz	19 (7.3)	10 (3.8)	29 (5.3)
Meybod	10 (3.8)	13 (5)	23 (4.8)
Sadugh	10 (3.8)	7 (2.7)	17 (3.2)
Tabas	27 (10.4)	18 (6.9)	45 (8.6)
Taft	4 (1.5)	11 (4.2)	15 (2.4)
Yazd	14 (5.4)	20 (7.7)	34 (7.6)
Total	133 (5.3)	144 (6.8)	277 (5.5)

Table III. Etiology of infertility.

Etiology	No. of couples suffered from primary infertility (%)	No. of couples suffered from secondary infertility (%)	Total
Male factor	35 (20.1)	9 (5.2)	44 (25.3)
Female factor	58 (33.3)	42 (24.1)	100 (57.5)
Both	12 (6.9)	2 (1.1)	14 (8)
Unexplained	11 (6.3)	5 (2.9)	16 (9.2)
Total	116 (66.7)	58 (33.3)	174 (100)

p-value= 0.03.

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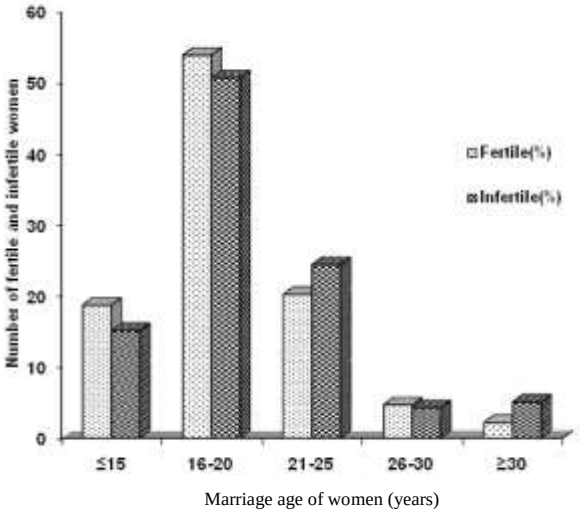

Figure 1. Infertility and marriage age of females.

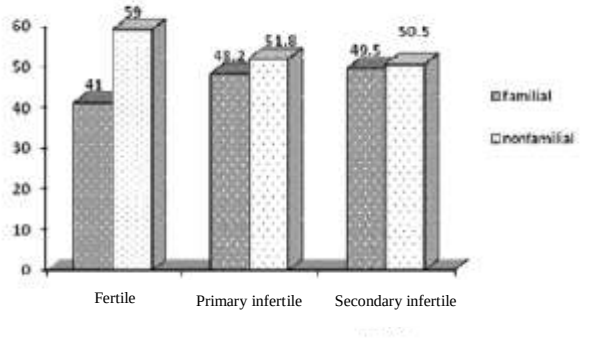

Figure 2. Relative distribution of infertility and familial marriage.

Discussion

Infertility is a major public health problem worldwide that has been encountered more during recent years. It seems to be effected by changes in familial condition and tendency to marriage, having child in higher age, more excessive use of contraception methods, illegal abortion, unfavorable socioeconomic condition, agents related to climate and geographic areas and perhaps genetic diversity.

Prevalence of infertility

Many studies were done about the prevalence and etiological factors of infertility. In United States, about 1 out of females reports one year of unprotected coitus without pregnancy (9). Depending on the type of population, source of data, and method of assessment, the incidence of infertility is different and based on the collected data by the World Health Organization was estimated to range from 0.4% to 66.6% (10). The average infertility in Africa is 10.1% of couples, with a high of 32% in some countries (11). The prevalence rate of infertility was found to be 14.1% during reproductive life in France (12). While it was in the U.S.A was 7.4% (4).

This is the first detailed study which evaluated the epidemiological and etiological aspects of infertility in Yazd province of Iran. In this study the prevalence of infertility was 5.52% which is close to some of other similar studies and is different from the other ones. It seems that the prevalence of infertility is relatively lower than the other similar studies.

Primary infertility was more common in Iran (61.37%). Of 250 infertile couples studied in Duhok Iraq, 77.2% had primary and 22.8% had secondary infertility (13). In Egypt the rates of primary and secondary infertility were 70.7% and 29.3% respectively among infertile couples (14). In Larsen study, primary infertility in Central Africa ranged from 6.9% to 3.1% and secondary infertility ranged from 18.9 % to 26.5% (3). The prevalence rate of infertility in the rural population of Gabon was 5.7% for primary and 20% for secondary infertility (15). In Sub-Saharan Africa, the percentage of primary infertility was 37.1% and secondary infertility was 62.9% (16) and in Rwanda this was 34% and 43% respectively. These data implicate that in Muslim countries such as Iran, Iraq and Egypt the pattern of infertility is different and primary type is more common. We think religious related factors such as social condition, cultural factors and sexual behavior affect this subject.

Demographic variables

Demographic variables such as age, sex, education, job and socioeconomic condition were evaluated in this survey. In our study group, 93% of women had marriage age ≤25 years, and based on the cultural condition, couples have a tendency to have child and taking medication during the first year of marriage. The lower prevalence of infertility in Iran could be related to the lower age of marriage. In the Kashmir region of India, 15% of the couples interviewed had primary infertility. Data from this study suggest that infertility in women peaks between the ages of 20 and 24, and slightly decreased until age 30 to 32 and more rapidly after age 40 (17). Despite of this in another study on 782 couples, infertility was estimated

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about 1% and this did not change with age (18). On the other hand, a too- early pregnancy could lead to sterility and can directly cause infertility by a perforated uterus during induced abortion, pelvic infection, endometrial lesions, ruptured uterus caused by a difficult labor and/or delivery, and puerperal infection (19). In current study, the prevalence of infertility was significantly higher in higher marriage age of women (also 72.5% of women had marriage age ≤20 years).

Association between high age of women and diminished fertility is well approved. Calendared age is the main determinant for success rate in Assisted Reproductive Technology (ART), spontaneous cycles, and ovarian storage (20, 21). Other demographic data, such as: job, rural and urban areas and educational level were obtained and there wasn't significant difference regarding these factors between fertile and infertile couples. The more frequency of infertility is shown in women with low level socioeconomic condition (8), but this study didn't confirm it. Leke *et al* (22) showed that environmental and cultural factors can affect the infertility rate, and also in our study, significant regional and geographical variations were seen.

Etiologic factors

Etiologic factor in our study can be divided into four major categories: female factor in 57.5%, male factors in 25.3%, combined factor in 8% and undetermined factors in 9.2%.

Lunenfeld and Insler (23) summarized the results from 6,549 infertile couples managed by different investigators. They reported that the incidence of tubal factor ranged from 11%-76.7% while ovulation disturbances were detected in 10.9%- 49.9%. Our results are similar to these except for a high incidence of polycystic ovarian syndrome (PCOS) that is seen in 58.8% of female factor. PCOS is 52.9%in Kuwait (24), 41% in Iraq (13) and 43.15% (25) in Pakistan which is more than tubal factor in that population. This pattern can implicate different frequencies of PCOS and needs more investigation.

Male factor was seen in 25.3% of men. Among them 20.1% had primary infertility and 63.8% had oligoasthenospermia. Primary infertility in infertile men was more common than to infertile women and this difference was significant. It can be due to primary causes such as genetic background and effective role of environmental agents in years before the puberty. Despite improvements in both diagnostic assessment and treatment of infertile couples, some couples still have no explanation for their infertility. Unexplained infertility (the failure to conceive of a couple in whom no definitive cause for infertility can be found) has an incidence of 10-20% in all infertile couples (26). Also, Collins and Rowe (27) observed that the proportion of couples with unexplained infertility ranged from 0%-26%. The incidence varies with the population studied and with the criteria used. In this study unknown infertility was reported in 9.2% of cases.

Consanguinity

Many studies have found that consanguinity poses a threat to child mortality and health and can also pose a threat to offspring survival before birth. Consanguinity was found to be a significant risk factor for reproductive wastage(28). In our study the infertility rate in couple with consanguineous marriage was more common and significant. It can show the probability of single gene disorder as a recessive manner.

Conclusion

This study has provided some important data about the epidemiologic and etiologic factors of infertility in this part of the world and can shows the priority of future plan for complementary assessment and preventive programs in general population.

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