

Preconception risk assessment of infertile couples

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ABSTRACT

Background: With regard to the importance of preconception conditions in maternal health and fertility, preconception risk assessment makes treatment trends and pregnancy outcome more successful among infertile couples. This study has tried to investigate preconception risk assessment in infertile couples.

Materials and Methods: This is a descriptive analytical survey conducted on 268 subjects, selected by convenient sampling, referring to Isfahan infertility centers (Iran). The data were collected by questionnaires through interview and clients' medical records. Pre-pregnancy risk assessment including history taking (personal, familial, medical, medications, menstruation, and pregnancy), exams (physical, genital, and vital signs), and routine test requests (routine, cervix, infections, and biochemical tests) was performed in the present study.

Results: The results showed that the lowest percentage of taking a complete history was for personal history (0.4%) and the highest was for history of menstruation (100%). The lowest percentage of complete exam was for physical exam (3.4%) and the highest for genital exam (100%). With regard to laboratory assessment, the highest percentage was for routine tests (36.6%) and the lowest was for infection tests (0.4%).

Conclusion: Based on the results of the present study, most of the risk assessment components are poorly assessed in infertile couples. With regard to the importance of infertility treatment, spending high costs and time on that, and existence of high-risk individuals as well as treatment failures, health providers should essentially pay special attention to preconception risk assessment in infertile couples in order to enhance the chance of success and promote treatment outcome.

Key words: Infertility, preconception care, risk assessment, Iran

INTRODUCTION

Maternal-child health is an important element in community health. In fact, fetal period makes a background for an individual's future health. Positive pregnancy outcome is tied to mother's preconception health. Mother's background diseases influence pregnancy outcome. For instance, previous studies have shown that pregnancy, accompanied with diabetes, leads to high prevalence of macrosomia, shoulder dystocia, intrauterin fetal death (IUFD), pregnancy induced hypertension (PIH), intrauterin growth restriction (IUGR), preterm labor, and congenital malformation of renal system and heart, as well as neural tube defects such as sacral agenesis.^[1] Ideal health of women before and during pregnancy should be considered as a process. The most vulnerable period concerning congenital defects is within 4-10 weeks of pregnancy, of which a period of time is from beginning of pregnancy to

a positive pregnancy test (when the mother is unaware of pregnancy). This time is a golden time to promote mother's biologic conditions to accept the fetus as much as possible. Therefore, preconception counseling concerning a healthy lifestyle and reduction of risk factors should start before pregnancy to ensure mothers' good health in this crucial time and during the whole pregnancy period.^[2] Inappropriate conditions that influence pregnancy can be detected by preconception risk assessment (as an important part of preconception care (PCC)), either to be deleted or to be modified in order to promote pregnancy outcome. The result of this latter action is provision of the best quality of life for the fetus, infants, and children through primary prevention as the goal of PCC.^[3] One of the important target groups for this function is infertile couples. Based on statistics, about 5-10% of couples at reproductive age s suffer from infertility.^[4]

Nowadays, infertility is treated by various methods, but most of these methods have high failure rate and cost, and need a long-term process. Infertile couples are among the high-risk groups who may face high fetal and congenital complications and low success is pregnancy. In addition, in many cases, existence of systematic diseases and undesired biological conditions is linked with couples' infertility leading to hard situations endangering a healthy productivity. For instance, there are some gastrointestinal diseases,

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accompanied with infertility and primary abortion, such as celiac disease, inflammatory bowel disease (ulcerative colitis and Crohn's disease), and hemochromatosis.

If health providers know well about the effects of these diseases on fertility system, they can change the trend of both the disease and infertility treatments based on the existing conditions through their preconception assessment. Since idiopathic infertility can be a sign for initial stage of aforementioned diseases, primary assessment of infertile couples concerning these diseases can result in a higher chance of a successful and complication-free pregnancy, as well as mothers' health promotion.^[5] Former researches have shown that health providers can increase the chance of successful treatment through preconception risk assessment and modification of risk factors, and ultimately promote pregnancy outcome.^[6] The necessity of infertile couples' comprehensive assessment before any treatment programs has been emphasized in other studies.^[4] Previous researches have shown other risk factors accompanied with infertility and pregnancy complications,^[7-9] whose modification before pregnancy can enhance the chance of fertility and reduce pregnancy complications.^[10-16] Through detection and assessment of these risk factors before pregnancy, their modification can be programmed and infertility treatment outcome can be promoted.

As, to the best knowledge of the researchers, no studies concerning the status of infertile couples' counseling before pregnancy, especially their risk assessment, had been already conducted in Iran, the present study aimed to define the manner of preconception risk assessment in infertile couples.

MATERIALS AND METHODS

This is a descriptive analytical survey conducted on 268 infertile couples, selected by convenient sampling, referring to all infertility services centers in Isfahan, Iran, at least for the second time during September 2008 to June 2009. The candidates for egg (oocyte) donation, sorogacy, and embryo donation did not enter the study. The data were collected through interviews and inquiring as well as going through clients' medical records after taking a written consent from them. The research tools were questionnaires and checklists.

First section of the questionnaire included personal information and the second section contained preconception risk assessment, which had been designed based on its standard components indicated in reference textbooks.

Risk assessment was divided into three items in the present study: 1) History taking (familial, personal, medical, menstrual, medications, and pregnancy); 2)

exams (physical, genital, and vital signs); and 3) laboratory assessment (routine tests, cervix, infection, and biochemical tests). The quality of risk assessment was recorded as complete, incomplete, and not done, based on medical records and clients' explanations. Content validity was adopted to confirm scientific validity of data collection tool. A researcher-made questionnaire was designed through literature review of related books and articles and with regard to the study goals and related variables. They were distributed among 10 expert academic members (gynecologist, masters of midwifery, and infertility center staffs). Then, their corrective indications were collected and the necessary modifications were done to increase content validity. The reliability of the questionnaire was confirmed by a pilot study conducted on 20 individuals, identical to those of the study, and Cronbach's alpha of 0.75. The latter 20 individuals did not enter the study. The data were analyzed by descriptive and analytical statistical tests (Pearson, Spearman, and Chi-square) through SPSS version 16.

RESULTS

In the present study, the status of risk assessment among 268 couples referring to infertility centers was investigated. Ten couples due to incomplete medical records and five couples due to personal problems were left out of the study. The findings of subjects' demographic characteristics have been presented in [Table 1]. In 88.1% of the subjects, there was primary infertility, with the highest prevalence of male infertility (38.8%). About 72.8% of the subjects had no history of former pregnancies, and the highest

Table 1: Frequency distribution of basic individual characteristics of infertile couples

Basic individual characteristics	Gender	
	Female	Male
Age <i>n</i> (%)		
<30 (years)	150 (56)	69 (25.7)
30-35 (years)	84 (31.3)	117 (43.7)
>35 (years)	33 (12.3)	82 (30.6)
Mean (\pm SD)	29.41 (\pm 4.99)	32.68 (\pm 5.17)
Education level <i>n</i> (%)		
Less than high school	84 (31.4)	138 (51.5)
High school diploma	115 (42.9)	95 (35.41)
University degree	69 (25.7)	30 (11.19)
Occupation <i>n</i> (%)		
Housekeeper	212 (79.1)	–
Employed	50 (18.7)	75 (28)
Self-employed	–	169 (63.1)
Others	6 (2.2)	24 (9)

prevalence of previous treatment method was for ovulation induction (27.2%).

The highest number of past treatments was 2 (44.8%) and the highest former treatment outcome was treatment failure (69%). Mean length of infertility time was 5.06 years, with the highest prevalence of 2 years among 35 subjects; mean treatment time was 3.64 years, with the highest prevalence of 3 years among 48 subjects.

The findings concerning history taking, physical exam, and laboratory tests requests have been presented in [Tables 2 and 3]. Based on the results, in 100% of the couples, history taking of menstruation and genital exams has been complete. In 61.1% of the couples with infertility problem due to pelvic factors, over 75% of the information related to history had been obtained (the highest partial frequency), while in infertility due to ovarian defect, in 77.8% of the couples, taking a history had reached over 75%. In 20.3% of the subjects with ovarian infertility, physical exam had been performed up to over 75%. Physical exam among the subjects with male infertility was 9.6%.

Table 2: Partial frequency distribution of risk assessment items

Risk assessment items	Risk assessment quality <i>n</i> (%)			Percentile of above 50% <i>n</i> (%)
	Incomplet <i>n</i> (%)	Complete <i>n</i> (%)	Not done <i>n</i> (%)	
History				
Familial	41 (15.3)	221 (81.7)	6 (2.2)	185 (69.03)
Personal	1 (0.4)	267 (99.6)	0 (0)	19 (7.09)
Medical	39 (14.6)	229 (85.45)	0 (0)	133 (49.63)
Drug	258 (96.6)	3 (1.1)	7 (2.6)	–
Menstrual	268 (100)	0 (0)	0 (0)	–
Pregnancy	163 (60.82)	105 (39.18)	0 (0)	221 (82.25)
Exam				
Physical exam	9 (3.4)	254 (94.78)	5 (1.9)	14 (5.22)
Genital exam	268 (100)	0 (0)	0 (0)	268 (100)
Vital sign	193 (72)	3 (1.1)	52 (19.4)	–
Laboratory assessment				
Routine	98 (36.6)	134 (49.6)	37 (13.3)	116 (80.6)
Cervix	2 (0.7)	190 (70.9)	76 (28.4)	–
Infections	1 (0.4)	141 (52.61)	126 (47)	16 (5.97)
Biochemical	11 (4.1)	106 (39.96)	151 (56.3)	11 (4.1)

The level of subjects' laboratory assessment did not reach over 75% in all infertility reasons. With regard to investigation of the association between infertility causes and risk assessment components, data analysis of Chi-square test showed a significant association between infertility reasons and the level of history taking and level of laboratory assessment, respectively ($P = 0.001$, $P = 0.002$). However, there was no significant association between infertility causes and the level of physical exams performed. The correlation between risk assessment components and subjects' personal characteristics was significant. There was a direct significant association observed between length of infertility and taking a history from the clients, physical exam, and routine laboratory tests [Table 4].

DISCUSSION

The present study was conducted to define preconception risk assessment in components of taking a history, physical exam, and laboratory assessment. It showed that most of the history taking components had been investigated incompletely in the studied subjects. Most history components can influence an individual's pregnancy outcome and infertility treatment. One of the most important parts of history is personal history. This part includes several items such as client's occupation, nutritional status, physical activities, sport, marital relationship, and so on, which are effective on fertility, infertility treatment, and pregnancy outcome.^[4,8-13,15,17-19]

Therefore, taking a personal history should be crucially considered and investigated as an important action before beginning infertility treatment. The second section of taking a history from the clients, studied in the present research, was family history. The present study showed that family history assessment was incomplete in most of the studied subjects, although various studies have shown that some diseases such as rheumatoid arthritis diseases, diabetes, and thyroid disorders which are accompanied with a positive family history lead to fertility problems and a poor pregnancy outcome.^[20-23] With consideration and a further assessment in high-risk groups with a positive family history concerning the existing diseases, preconception risk factors can be detected to enhance the chance of fertility through appropriate treatments.

Table 3: Partial frequency distribution of risk assessment according to infertility factors

Risk assessment Infertility factors	History taking <i>n</i> (%)			Physical exam <i>n</i> (%)			Laboratory assessment <i>n</i> (%)		
	<50%	50-75%	>75%	<50%	50-75%	>75%	<50%	50-75%	>75%
Ovarian factors	3 (3.8)	54 (68.4)	22 (27.8)	21 (26.6)	42 (53.2)	16 (20.3)	65 (82.3)	14 (17.7)	0.0 (0)
Pelvic factors	2 (3.7)	19 (35.2)	33 (61.1)	13 (24.1)	34 (63)	7 (13)	39 (72.2)	15 (27.8)	0.0 (0)
Male factors	2 (1.9)	51 (49)	51 (49)	25 (24)	69 (66.3)	10 (9.6)	64 (61.5)	40 (38.5)	0.0 (0)
Unknown factors	0 (0)	15 (48.4)	16 (51.6)	10 (32.3)	17 (54.8)	4 (12.9)	15 (48.4)	16 (51.6)	0.0 (0)

Table 4: Correlation between individuals' characters and some risk assessment items (r)

Risk assessment (%)	Literacy	Duration of infertility (years)	Duration of infertility treatment (months)	Treatment time
Personal history	0.13*	-0.07***	-0.02***	0.08
Medical history	-0.07***	0.05***	0.01***	0.04
Familial history	-0.1***	0.17*	0.11***	0.12
Drug history	0.11***	0.11***	0.11***	0.04
Pregnancy history	-0.12***	0.2*	0.18*	0.26
Physical exam	0.04***	0.18*	0.13*	0.21
Vital signs	0.0***	0.09***	0.12***	0.1
Routine test	0.13*	0.2*	0.2*	0.12
Cervical test	0.1***	0.33**	0.27**	0.23
Infection test	0.12***	0.07***	0.06***	-0.12
Biochemical test	0.24**	0.19*	0.14*	0.04***

Individuals characters (r), *P<0.05**, P<0.001***, P>0.05

At the time of taking a history from the clients, its components are usually asked as a general concept and not as item-by-item in detail, so the responder's answers are also general.

Defective function of taking a history revealed by the present study can be due to the aforementioned reason. In this case, going through the details (inquiring the history of the diseases one by one) may solve this problem. The third section of assessment under study was taking a personal medical history. The findings showed that taking subjects' medical history before pregnancy was incomplete, although previous studies have shown negative effects of the diseases on the trend of pregnancy.^[24,25] A study showed that among the patients suffering from lupus erythematosus, *in vitro* fertilization (IVF) is a safe method only when this disease has been precisely investigated and treated before pregnancy.^[26] Some other researchers argue that infertility and endocrine disorders are seen more in epileptic patients compared to other individuals. In fact, 38.4% of epileptic patients are infertile. They receive more antiepileptic medication and less education; therefore, preconception assessment is essential for them.^[27-29]

Various studies have shown that mothers' mortality and pregnancy complications are related to the chronic diseases which are preventable and treatable before pregnancy. Since the women undergoing infertility treatment are mostly at higher ages compared to other people, they are at a higher risk of chronic diseases, and as chronic diseases increase IVF complications, these diseases should be assessed and treated before administration of infertility treatment in order to guarantee the safety of treatment and pregnancy.^[30] Other researchers also emphasize on the need for preconception diseases' assessment.^[31] With regard to the components of history, it seems essential to go through these components more precisely before

infertility treatment starts, in order to modify the risk factors and promote pregnancy outcome and infertility treatment techniques. The second studied component in preconception risk assessment was physical exam. A perfect physical exam can reveal the existence of many problems in an individual. These problems determine an individual's general health, which affects pregnancy and infertility treatment outcome. In the present study, only physical exam of genital system had been completely conducted for all the subjects, while a systematic exam had not been completed for a high percentage of the subjects.

This problem is possibly due to the fact that initial assessment of genital system health and disorders is mostly considered to be related to the issue of infertility, while all of the systems within the body interact with one another to keep an organism healthy. Although each system has specific functions, they are all interconnected and dependent on one another. Some studies have shown that central body obesity is directly associated with menstrual disorders and/or increased wrist size can be associated with oligomenorrhea and results in infertility.^[32] The third studied component in preconception risk assessment was laboratory assessment. The present study showed laboratory assessment was either incomplete or even ignored in all the subjects. These results show a very low consideration of this important issue, although in some cases, routine tests had been somehow considered.

In fact, treatment team had considered these tests notable just in the trend of infertility treatment, while clinical tests can also reveal development of some other diseases which can, based on several studies, affect the infertility treatment and pregnancy outcomes.^[24,25,33]

Several studies have shown that some preconception abnormal laboratory values can predict undesirable outcome

of a pregnancy after IVF.^[34] Some others may be associated with systematic complications affecting the pregnancy outcome.^[35] It should be considered that some diseases have no specific clinical signs, and screening of diseases such as diabetes is a major component of preconception assessment, especially among infertile women. For instance, polycystic ovarian syndrome (PCOS), which exists in 5-10% of women at reproductive age, is one of the major reasons for infertility, and is a risk factor for cardiovascular diseases, insulin resistance, dyslipidemia, diabetes mellitus, arterial hypertension, endothelial dysfunction, metabolic syndrome, and central obesity. Preconception assessment, screening for these diseases, and administration of interventional treatments among these patients can reduce oligomenorrhea and infertility.^[36,37] Based on experience of researcher assessment of all infertile persons, especially in PCOS group, in the process of infertility treatment is essential in order to screen for the existing diseases through complete laboratory tests and leads to prevention and treatment of many diseases and their complications. Meanwhile, these tests were taken not more than others in this group in the present study. The findings of the present study showed a direct and significant association between the causes of infertility and the level of history taking and laboratory assessments. This association was not significant for physical exam. In the first two sections, the highest weakness was in relation to ovarian causes of infertility, possibly as a result of a more absolute diagnosis, which has probably hidden the necessity for a more comprehensive assessment from the view of the treatment team. In fact, taking a history and laboratory assessment was of minor importance from the viewpoint of treatment personnel in this group, while infertility problems of this group, like the other causes, could be associated with clients' negative history and possibly their laboratory disorders.

Another reason for interventional defect in this group can be argued. As these individuals formed the best group responding to ovulation induction, treatment was started for them before a complete assessment.

On the other hand, taking a history has been considered more in the idiopathic infertile group, possibly as a result of clients' more referring to the centers and a more attention paid by the treatment team to diagnose the cause of infertility. Another important finding of the present study was the association between risk assessment and length of infertility, and then, duration of treatment.

Finally, infertile couples, facing the infertility problem for a longer period of time and with more frequent referring to the infertility centers possibly, gave the treatment team more chance and motivation to conduct a more precise and complete assessment.

CONCLUSION

The results of the present study showed that the approach by the infertility team considering preconception risk assessment as not only essential to achieve success in treatment but also as an essential element to make appropriate conditions for pregnancy was of minor importance in infertility treatment team. Risk assessment has been conducted just to succeed in infertility treatment and not to promote pregnancy outcome, whereas it can not only lead to more success of treatment but also make an appropriate biological environment for women to accept pregnancy as well, if assessments are completely administered at the very early stages when the clients refer to the centers.

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