Original Article

Preconception interventions in infertile couples

Nafisehsadat Nekuei, Ashraf Kazemi, Akbar Hasanzadeh[1]

Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, [1]Department of Epidemiology and Biostatistics, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

ABSTRACT

Background: Preconception interventions in infertile couples can increase the chance of pregnancy and lower its complications. The success in infertility treatment and achieving a successful pregnancy is of great importance among infertile couples compared to others. This study has tried to investigate necessary preconception interventions before beginning of infertility treatment cycle among infertile couples. **Materials and Methods:** This is a cross-sectional study of 268 individuals presenting to fertility clinics (Moshtagh and Shahid beheshty) across the city of Isfahan, Iran. Simple sampling method was used. Questionnaire and patients' medical records were used to collect data. Descriptive and analytic statistical methods and SPSS software were used for analysis. **Results:** The results showed that the interventions related to diseases treatment and prescription of folic acid before the beginning of infertility treatment were complete for most of the subject (47.06% and 79.9% respectively), but referral for genetics counseling had not been conducted in most of the cases (98.9%). Specific interventions in relation with the infertility treatment before beginning the treatment cycle had been conducted in 50% of the subjects. **Conclusion:** The results of this study showed a weakness concerning necessary preconception interventions before beginning of infertility treatment cycle in most of the studied subjects. With regard to the effect of preconception interventions on outcome of infertility treatment, and with consideration of high importance of pregnancy success in infertile couples, paying more attention to conduct this manner is necessary.

Key words: Infertility, Iran, preconception care, pregnancy outcome, subfertility

INTRODUCTION

The first gestational weeks are the most important time for fetal development, and since the mothers may not be aware of their pregnancy at this time and refer for prenatal care when this time has passed, ante partum interventions seem essential. Preconception care (PCC) and provision of maternal health before pregnancy are the key elements for a good pregnancy outcome and prevention of its negative results.[1]

A study (2002-2010) showed that 49% of the women did not have appropriate PCC and experienced worse health conditions in their pregnancy compared to those who had received complete PCC, and this issue revealed that preconception interventions are essential.[2] As a matter of fact, PCC is a sort of preventive medicine including three major components: 1) evaluation of risk factors, 2) health promotion, and 3) interventions with goal of promotion of pregnancy outcome.[3] Infertile individuals have a specific position concerning pregnancy outcome among reproductive age groups. Prevalence of general infertility, primary infertility, and secondary infertility have been reported to be 11.5-15.7%, 0.6-3.4%, and 8.7-32.6% in various reports, respectively.[4,5]

Address for correspondence: Ms. Nafisehsadat Nekuei, Department of Midwifery and Reproductive Health, School of Nursing and Midwifery, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: nekuei@nm.mui.ac.ir

Access this article online	
Quick Response Code:	Website: www.jehp.net
	DOI: 10.4103/2277-9531.139683

This article may be cited as: Nekuei N, Kazemi A, Hasanzadeh A. Preconception interventions in infertile couples. J Edu Health Promot 2014;3:101.

Another study reported that prevalence of infertility in Yazd, Iran is 5.52% (primary 3.48% and secondary 2.04%).[6] This rate has been reported to be 8% in another study.[7] Nowadays, infertility is treated through various methods. These methods usually have a high failure rate, are costly, need medical interventions, and are often of high risk. Any method, which can promote the success of infertility treatment methods and lowers costs and complications, can be accepted in a medical system. On the other hand, infertile couples usually have more risk factors compared to other individuals. One of these risk factors is mothers' high age, which is a factor on increase of chronic diseases such as obesity, diabetes, hypertension, malignancy, and cardiovascular diseases.[3] These diseases, accompanied with pregnancy, can lead to poor pregnancy and infertility treatment outcomes. Health care enhances the chance of infertility treatment and promotes pregnancy outcome through changing risk factors and conducting the preconception interventions.[8] Preconception interventions in infertile couples can increase the chance of pregnancy and lower its complications.[9-12] In fact, these interventions act as an important factor to evaluate the infertile couples thoroughly, enhance their health level before beginning the treatment, and ultimately, promote pregnancy outcome. As the success in infertility treatment and achieving a successful pregnancy is of great importance among infertile couples compared to others, and a failure in pregnancy success leads to numerous psychological and mental complications, financial burden and disintegration of family unit, and with regard to the role of preconception interventions as a convenient, cost-effective, and practical factor in reduction of risk factors and increase of pregnancy success, the researchers have paid a specific and close attention to this group. Previous studies have not reported the effect and quality of necessary interventions concerning infertility treatment and their outcome before beginning infertility treatment in these individuals in Iran.

Therefore, this study was designed to evaluate the manner of necessary preconception interventions before pregnancy and beginning of any infertility treatment cycle including disease treatment, genetics counseling, and other issues in infertile couples.

MATERIALS AND METHODS

This is a cross-sectional study of 268 individuals who received treatment for infertility for at least the second time at specialist clinics across the city of Isfahan, Iran. The study was conducted between September 2008 and May 2009. Excluded from the study were couples who used donated eggs/fetuses or gestational surrogacy techniques. Simple sampling method was used. Data were collected after obtaining written informed consent from subjects from questionnaires, interviews, and patients' medical records. The research tool consisted of a two-part questionnaire: Personal details were entered in part one and included 10 items (age, education level, occupation, infertility category, infertility cause, infertility duration, treatment duration, treatment done, outcome of previous treatment, and treatment times). Part two obtained information about the couples' preconception interventions and included 4 major components: 1) diseases treatment if they exist, and change of consumed medication if needed, 2) prescription of folic acid, 3) genetics counseling referral, and 4) conducting any specific interventions. The quality of conducting the above items "completely," "incompletely," and "not given" was evaluated based on existing medical profiles and clients' explanations.

A pilot study was performed on 20 individuals who were similar to the main study subjects with the intent to assess the reliability of our question achieved. Pilot study subjects were not included in the main study. After the completion of sampling, we applied descriptive-analytical statistical methods (Pearson's Chi-square and Spearman correlation analysis) to process data. SPSS software (version 16) was used. The Ethics Committee of the Isfahan University of Medical Sciences approved this study.

RESULTS

We studied 268 couples who presented to fertility clinics. Ten couples were excluded because excluded for personal reasons. The demographic characteristics of subjects are shown in Table 1.

Descriptive analytical methods were used for analysis.

Most of the women were under 30 years of age and men 35-30 years. The highest educational level was diploma in women and under diploma in men. In terms of employment, the majority of women were housekeeping and the majority of men were self-employed.

We demonstrated that primary infertility was 88.1% with maximum prevalence related to male factors. 72.8% were not pregnant at now, and the maximum prevalence for the previous treatment was induction ovulation (27.2%). Most couples were undergoing their second cycle of infertility treatment (44.8%), and 69% failed the previous treatment. The mean infertility duration was 5.06 years, and the duration of infertility treatment in couples was 3.64 years.

Frequency distributions of conducted necessary preconception interventions have been presented in Table 1.

From total of 268 couples, 34 couples needed medical treatment interventions for diseases and/or change of preconception consumed medication. Frequency distribution of the level of preconception intervention, based on infertility

Table 1: Frequency distribution of preconception interventions

Intervention quality / Intervention type	*N* (%)			
	Complete	Incomplete	Not given	Total
Disease treatment	16 (47.06)	5 (14.71)	13 (38.24)	34 (100)
Prescribe folic acid	214 (79.9)	0 (0)	54 (20.1)	268 (100)
Genetic counseling	3 (1.1)	0 (0)	265 (98.9)	268 (100)

etiology, has been presented in Table 2. The obtained results showed that infertility etiology was significantly associated with folic acid consumption and genetics counseling ($r = 0.004$ and $r = 0.02$, respectively). From total of 268 subjects, 22 subjects (8.2%) needed conducting a specific intervention related to preconception infertility treatment. Frequency distribution of these specific interventions has been presented in Table 3.

From this group, the needed intervention was conducted "completely" in 11 subjects (50%), and in the rest of the subjects (50%), the related interventions had not been conducted at all. The results showed no significant association between conducting specific intervention and infertility etiology.

DISCUSSION

This study was carried out to investigate preconception needed intervention status before beginning treatment cycle in infertile couples. The first studied component was related to treatment of existing diseases and change of consumed medications if needed. In the present study, in less than half of the cases who needed this intervention, the intervention had been "completely" conducted. With regard to the negative effect of involvement in many diseases on fertility power, pregnancy outcome and trend of infertility treatment, change of disease trend, limitation of medications consumption, and the manner of response to medication in pregnancy, it is essential to consider the existence of major preconception diseases and beginning of infertility treatment to conduct necessary treatment if needed.

On the other hand, many of the medications are teratogenic and/or need a dosage or the type change due to other reasons before pregnancy and beginning of the treatment cycle and should be precisely and carefully prescribed in infertile individuals due to more importance of pregnancy.

Unfortunately, in the present study, these interventions had not been "completely" carried out. Based on the researches, chronic diseases in mothers can increase the related risks of *in vitro* fertilization (IVF) and mothers' mortality as well as other pregnancy-related risks factors. Mothers' mortality due to chronic diseases is preventable through better preconception medical care. All these actions promote mothers' preconception health and diminish pregnancy-related complications.[3] Another study in this regard showed that medical care, close to pregnancy, was less than normal in diabetic women undergoing infertility treatment. This study recommends preconception close consideration of folic acid prescription and blood sugar control.[13]

Based on the researches, 0.5-4% of the pregnancies occurs in women with cardiovascular diseases. The risk of a poor pregnancy outcome increases in these pregnancies. Cardiac functions, consumption of teratogenic medications, genetic counseling, and other important interventions should be considered in this group.[14] In group of infertile couples, the above interventions should be carried out with specific attention due to more importance of pregnancy and its good outcome.

In the present study, folic acid was prescribed for most of the qualified subjects, which reveals the health providers' close attention to this essential issue. Former studies also showed that infertile couples are aware of the necessity of folic acid consumption although just awareness of consumption cannot necessarily result in its regular consumption;[15] therefore, close attention of health services providers to prescription of folic acid is crucially important. De weed *et al.* showed that preconception counseling to the couples in relation with folic acid leads to their increased consumption and consequently, improvement of women's folate reserves.[16]

Folic acid consumption is crucial for all women at reproductive age who are waiting for a pregnancy and possibly diminishes neural system defects. So, complementary consumption of folic acid and enrichment of the foods with that can result in lower fetal mortality due to neural tube defects.[17] However, prescription of folic acid and enrichment of foods with that before pregnancy seem to possibly influence IVF results through their effects on the number of fetuses. Although in the present study, a high percentage of the subjects received folic acid, yet it is not ideal such that 100% of the subjects are expected to consume that. The obtained results also show that most of the subjects in all groups with various infertility etiologies received folic acid before beginning of treatment cycle, but the infertile couples with ovarian factors had this medication with the highest frequency while those with unknown and pelvic factors had that with the lowest frequency. Since the infertile couples with ovarian factors have the highest chance of success in infertility treatment, folic acid consumption has possibly been considered for these subjects.

In the present study, 98.9% of the subjects were not referred to genetics counseling. As genetic disturbances can act as

Table 2: Frequency distribution of preconception intervention according infertility causes

Intervention quality / Infertility causes	*N* (%)							
	Disease treatment			Folic acid prescription			Counseling genetic	
	Complete	Not given	Incomplete	Complete	Incomplete	Not given	Complete	Incomplete
Ovarian causes	2 (33.3)	4 (66.7)	0 (0)	72 (91.1)	7 (8.9)	0 (0)	0 (0)	79 (100)
Pelvic causes	2 (25)	4 (50)	2 (25)	37 (68.5)	17 (31.5)	0 (0)	0 (0)	54 (100)
Male causes	12 (66.7)	3 (16.7)	3 (16.7)	84 (80.8)	20 (19.2)	0 (0)	1 (1)	103 (99)
Unknown causes	2 (100)	0 (0)	0 (0)	21 (67.7)	10 (32.3)	0 (0)	2 (6.5)	29 (93.5)

Table 3: Frequency distribution of specific action according to infertility causes

Intervention quality / Infertility causes	*N* (%)			
	Complete	Incomplete	Not given	Total
Ovarian	2 (28.6)	0 (0)	5 (71.4)	7 (100)
Pelvic	2 (66.7)	0 (0)	1 (33.3)	3 (100)
Male	7 (70)	0 (0)	3 (30)	10 (100)
Unknown	0 (0)	0 (0)	2 (100)	2 (100)

a reason for infertility and/or primary abortions as well as a poor pregnancy outcome, this issue should be considered more before beginning of the infertility treatment cycle. Since 12.3% of the subjects in the present study were over 35 years of age, the necessity to genetics counseling seems essential at least in this age group. High-risk groups concerning genetic disturbances should be detected among the couples referring to infertility clinics. The obtained results showed that 9.7% of the subjects underwent infertility treatment as a result of an ovary disease, which often needs further counseling and genetics evaluations for its absolute diagnosis while none of the subjects underwent genetics investigation. A study showed that genetics disturbances in infertile couples, especially azoospermic individuals, lead to an increase in treatment team information in male infertility treatment and is counted as a treatment guideline.[18] Another study on infertile women showed that polymorphism on folate pathway genes can be one of the infertility causes among women with unknown infertility.[19] In a study on family physicians of PCC team, most of the subjects (69.2%) stated that they did not conduct genetics screening in PCC trend.[20] In the present study, in all groups with various infertility etiologies, most of the subjects did not receive genetics counseling. It should be noticed that the highest partial frequency of genetics counseling (6.5%) was seen in unknown infertility group. Although the number of the subjects undergoing counseling is lower to have an appropriate judgment in this group, the nature of unknown infertility forces the physicians to have a precise investigation and use numerous diagnostic methods to achieve the final diagnosis. As genetics disturbances often have negative effects on infertility-related factors, these interventions should be carried out more than that observed in this group. The findings show that, in relation with specific intervention in infertile couples, preconception specific interventions were conducted "completely" in 50% of the subjects (11 subjects). One of the expected specific interventions in this period is giving the client an appropriate diet to regulate her weight. As 4-18% of the women suffer from polycystic ovarian syndrome and lack of hormonal balance (as one of the important causes of infertility), which are accompanied with overweight and obesity, the first recommendation and intervention to treat infertility is losing weight which increases the chance of ovulation and consequently spontaneous pregnancy.[21] Researchers have shown that overweight and obesity in women lead to increase of infertility risk, maternal and fetal complications.[22-24] Other studies have also shown the importance of fixing the diet and weight in individuals undergoing infertility treatment.[25]

Another specific intervention in these individuals is their referral to counseling centers to have a program to quit their addiction. Numerous studies have shown that if smoking cessation is not done before pregnancy, success of ART is decreased.[26]

There are specific conditions, affecting the power of fertility and results of infertility treatment, which should be assessed before pregnancy so that needed specific interventions can be conducted to modify them.

The results of the present study showed a weakness concerning necessary interventions before pregnancy and beginning of infertility treatment cycle in most of the studied subjects. With regard to the effect of preconception condition on the success of pregnancy and the outcome of infertility treatment, and with consideration of high importance of pregnancy success in infertile couples, it seems that health services providing team should pay more attention to conduct necessary preconception interventions, which need low costs and little time. Preparation of standard forms, precise programming, and sensitization of infertility centers personnel can result in conducting these interventions regularly and in an appropriate time.

ACKNOWLEDGMENTS

The authors find it necessary to express their gratitude toward officials, personnel, and patients of fertility and infertility centers of Isfahan city. Also, we must appreciate Vice-Chancellery for Research and Technology of Isfahan University of Medical Sciences (Iran) for their collaboration and financial support of this research project.

REFERENCES

1. Wade GH, Herrman J, McBeth-Snyder LA. Preconception care program for women in a college setting. MCN Am J Matern Child Nurs 2012;37:164-70.
2. Centers for Disease Control and Prevention (CDC). Preconception health indicators among women-Texas, 2002-2010. MMWR Morb Mortal Wkly Rep 2012;61:550-5.
3. Yakir S, Riskin-Mashiah S, Lavie O, Auslender R. Medical evaluation prior to fertility treatment-time for reconsideration?. Harefuah 2011;150:844-8, 875.
4. Mascarenhas MN, Cheung H, Mathers CD, Stevens GA. Measuring infertility in populations: Constructing a standard definition for use with demographic and reproductive health surveys. Popul Health Metr 2012;10:17.
5. Bushnik T, Cook JL, Yuzpe AA, Tough S, Collins J. Estimating the prevalence of infertility in Canada. Hum Reprod 2012;27:738-46.
6. Aflatoonian A, Seyedhassani SM, Tabibnejad N. The epidemiological and etiological aspects of infertility in Yazd province of Iran. Iran J Rep Med 2009;7:117-22.
7. Safarinejad MR. Infertility among couples in a population-based in Iran: Prevalence and associated risk factors. Int J Androl 2008;31:303-14.
8. Moran LJ, Brinkworth G, Noakes M, Norman RJ. Effects of lifestyle modification in polycystic ovarian syndrome. Reprod Biomed Online 2006;12:569-78.
9. Bombard JM, Robbins CL, Dietz PM, Valderrama AL. Preconception care: The perfect opportunity for health care providers to advise lifestyle changes for hypertensive women. Am J Health Promot 2013;27 (3 Suppl):S43-9.

10. Twigt JM, Bolhuis ME, Steegers EA, Hammiche F, van Inzen WG, Laven JS, *et al*. The preconception diet is associated with the chance of ongoing pregnancy in women undergoing IVF/ICSI treatment. Hum Reprod 2012;27:2526-31.
11. van der Zee B, de Beaufort I, Temel S, de Wert G, Denktas S, Steegers E. Preconception care: An essential preventive strategy to improve children's and women's health. J Public Health Policy 2011;32:367-79.
12. Anderson K, Nisenblat V, Norman R. Lifestyle factors in people seeking infertility treatment-A review. Aust N Z J Obstet Gynaecol 2010;50:8-20.
13. Riskin-Mashiah S, Auslander R. Quality of medical care in diabetic women undergoing fertility treatment: We should do better! Diabetes Care 2011;34:2164-9.
14. Merz WM, Gembruch U. Preconception and contraceptive counselling of women with cardiovascular diseases. Z Geburtshilfe Neonatol 2012;216:45-53.
15. Frishman GN, Suprell TP, Heber WW. Folic acid Preconception knowledge and use by infertile women. J Reprod Med 2001;46:1025-30.
16. De Weerd S, Thomas CM, Cikot RJ, Steegers-Theunissen RP, de Boo TM, Steegers EA. Preconception counseling improves folate status of women planning pregnancy. Obstet Gynecol 2002;99:45-50.
17. Blencowe H, Cousens S, Modell B, Lawn J. Folic acid to reduce neonatal mortality from neural tube disorders. Int J Epidemiol 2010;39 Supppl 1:i110-21.
18. Lee JY, Dada R, Sabanegh E, Carpi A, Agarwal A. Role of Genetic in Azoospermia. Urology 2011;77:598-601.
19. Altmae S, Stayreus-Evers A, Ruiz JR, Laanpere M, Syvanen T, Yngve A, *et al*. Variations in folate pathway genes are associated with unexplained female infertility. Fertil Steril 2010;94:130-7.
20. Bonham VL, Knerr S, Feero WG, Stevens N, Jenkins JF, McBride CM. Patient phsical charactristics and primary care physician decision making in preconception genetic screening. Public Health Genomic 2010;13:336-44.
21. McFarland C. Treating polycystic ovary syndrome and infertility. MCN Am J Matern Child Nurs 2012;37:116-21.
22. Rowlands I, Graves N, de Jersey S, McIntyre HD, Callaway L. Obesity in pregnancy: Outcomes and economics. Semin Fetal Neonatal Med 2010;15:94-9.
23. Scialli AR. Teratology public affairs committee position paper: Maternal obesity and pregnancy. Birth Defects Res A Clin Mol Teratol 2006;76:73-7.
24. ESHRE Capri Workshop Group. Nutrition and reproduction in women. Hum Reprod Update 2006;12:193-207.
25. Mmbaga N, Luk J. The impact of preconceptual diet on the outcome of reproductive treatments. Curr Opin Obstet Gynecol 2012;24:127-31.
26. Grainger DA, Fraizer LM, Rowland CA. Preconception care and treatment with assisted reproductive technologies. Matern Child Health J 2006;10 (5 Suppl):S161-4.

Source of Support: Isfahan University of medical sciences, **Conflict of Interest:** None declared