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The effect of educational program based on theory of planned behavior on health promotion and childbearing of minor thalassemia couples

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Abstract:

INTRODUCTION: It is essential to provide key information and support to every woman regarding pregnancy and childbirth to enable all women to make a fully informed decision regarding their choice of reproduction. The study aimed to find the impact of an educational program based on the Theory of Planned Behavior (TPB) on health promotion and childbearing of minor thalassemia couples.

SUBJECTS AND METHODS: This study was quasi-experimental. A total of 70 women with minor thalassemia held in Minudasht health center were classified into two groups: study and control. The study group received the educational program based on TPB, and the control group only received the routine program. The data were collected using the TPB-based questionnaire at baseline and 3 months after the intervention. They were analyzed by Chi-square, Student's t-test, Wilcoxon test, and regression analysis through SPSS version 16.

RESULTS: The mean (standard deviation) ages of the participants in the control and study group were 30.69 (6.20) and 31.08 (6.66), respectively. There were significant differences between the two groups (study vs. control) in terms of perceived behavioral control, intention, attitude, or childbearing behavior ($P < 0.001$). The change in fertility behaviors had a significant increase in the study group (62.8%) compared to the control group (2.9%) ($P < 0.001$).

CONCLUSION: Based on the results, the TPB is an effective model to explain fertility intentions and behaviors in Iranian women with minor thalassemia; however, further researches are needed to generalize our findings to other people including healthy women.

Keywords:

Childbearing, health promotion, minor thalassemia, randomized controlled trial, Theory of Planned Behavior

Introduction

Thalassemia is one of the most common genetic and chronic diseases in Iran and in the world,^[1] where the synthesis of the globin chain is impaired and may lead to severe anemia.^[2,3] Therefore, the lives of people with thalassemia are dependent on blood transfusions and permanent medical care.^[1] There are

currently around 200 million people with thalassemia and 100 million asymptomatic carriers in the world,^[3,4] and 700 million babies are annually born with thalassemia.^[4] The highest prevalence of thalassemia in the northern provinces of the country (Golestan and Mazandaran) is 10%–13%. Around the world, such as Asia, India, and the Middle East, 95% of the births are affected by thalassemia.^[5]

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More than 30,000 people are infected, and about 4% are carriers of the disease in Iran.^[6,7]

Major thalassemia is associated with acute complications, and people are usually at high risk of death until the fourth decade. Beta thalassemia affects the limb, has many complications and significant mortality.^[8] The most important concern in couples with thalassemia is childbearing, because pregnancy is associated with increased risk of maternal and fetal complications in them, and they should be considered high-risk pregnancies.^[9] The couples with thalassemia are worried about their fertility and they avoid pregnancy because of the increased likelihood of giving birth to babies with major thalassemia. The reason for their fears is lack of knowledge about prevention and diagnostic screening on thalassemia.^[10-12] Fertility behavior includes childbearing, number of children, distance between pregnancies, making decisions about childbearing, contraceptive methods, sexual preference, and unwanted pregnancies in some studies.^[13,14] Health education is one of the most important factors in improving reproductive behavior.^[15] Behavioral study models can improve the attitude and performance of individuals in their fertility behavior.^[16]

Based on behavioral theories, fertility is a rational decision process that measures the costs and benefits of behavior. Theory of planned behavior (TPB) is one of them,^[17,18] and it is the best model for responsible decision-making in fertility.^[19] It includes the main constructs such as attitude toward behavior, subjective norms, and perceived behavioral control (PBC).^[17,18] Attitude refers to behavioral beliefs and behavioral consequences assessment, subjective norms refer to general perceptions of social pressure (normative beliefs and motivation to follow), and PBC refers to facilitating factors and barriers to behavior (control beliefs and perceived power).^[18,20] Health-care providers have a pivotal role in designing, planning, implementing, and evaluating health promotion and health education programs.^[21] According to this study, fertility behavior means pregnancy or family planning, somehow the women who have contraceptive method but are eligible for childbearing stop them, and those who are not eligible for childbearing (because of aging or sufficient number of babies or specific diseases) choose an appropriate contraceptive method.

Caplescu demonstrated that many factors behavior such as age, number of babies, woman's attitude, and perception of her family about pregnancy and contraception are effective in fertility behavior.^[22] Complications with thalassemia such as infant mortality, stillbirth, undesirable reproductive health, unplanned pregnancy, abortion without prenatal diagnosis (PND), and thalassemia major^[23] with thalassemia in limited descriptive studies have been reported.^[12] In addition,

financial problems and low awareness of the families were reported as a reason for thalassemia major.^[24,25]

Some studies have proposed educational programs to improve the fertility behavior of women with thalassemia.^[12,23-27] Cognition and perception of fertility behavior can be effective in reproductive health services including policy-making and planning; therefore, it leads to improve family and community health and quality of life. Since there is no research about educational intervention on women with minor thalassemia in Iran, and thalassemia is a major health problem in Golestan Province, this study aimed to find out the effect of an educational program based on TPB on fertility behavior of minor thalassemia couples in Minudasht in 2018.

Subjects and Methods

This was a quasi-experimental study on women with minor thalassemia referring to health-care centers in Minudasht during July–November 2018. The sample size was calculated according to the study by Keramat *et al.*,^[28] the success rate of behavior in the control and study group was 60% and 90%, respectively. The number of samples required for the study with 95% confidence level, test power of 80 was at 35 patients with consideration of possible number of patients dropping out in each of study and control groups (total of 70) [Figure 1]. Informed written consents were obtained before the study from women with minor thalassemia. The Ethics Committee of Mashhad University of Medical Sciences' Faculty of Nursing and Midwifery approved the study (Ethics code No. IR.MUMS.REC.1396.6) and registered it in Iran Clinical Trials Registry (IRCT20170707034931N2code). The patients were selected based on the inclusion criteria which were as follows.

Women with minor thalassemia (whose husbands also had the condition), aged between 15- and 49-year-old, without any previous male or female infertility consented to participate in the research. The exclusion criteria were spouse's death and reluctance to continue in the study. Due to the possibility of patients' contamination, the study and control groups were selected from Minudasht and Galikesh cities, respectively. There was no attrition, and all of the participants finished the interventional program. The questionnaire used in this study was structured and consisted of two parts.

Part A

The demographic information including age, ethnicity, education, and occupation (woman and husband), length of marriage, number of pregnancies (gravida), deliveries and abortions, number of babies with thalassemia, number of thalassemia abortions, history of unexpected

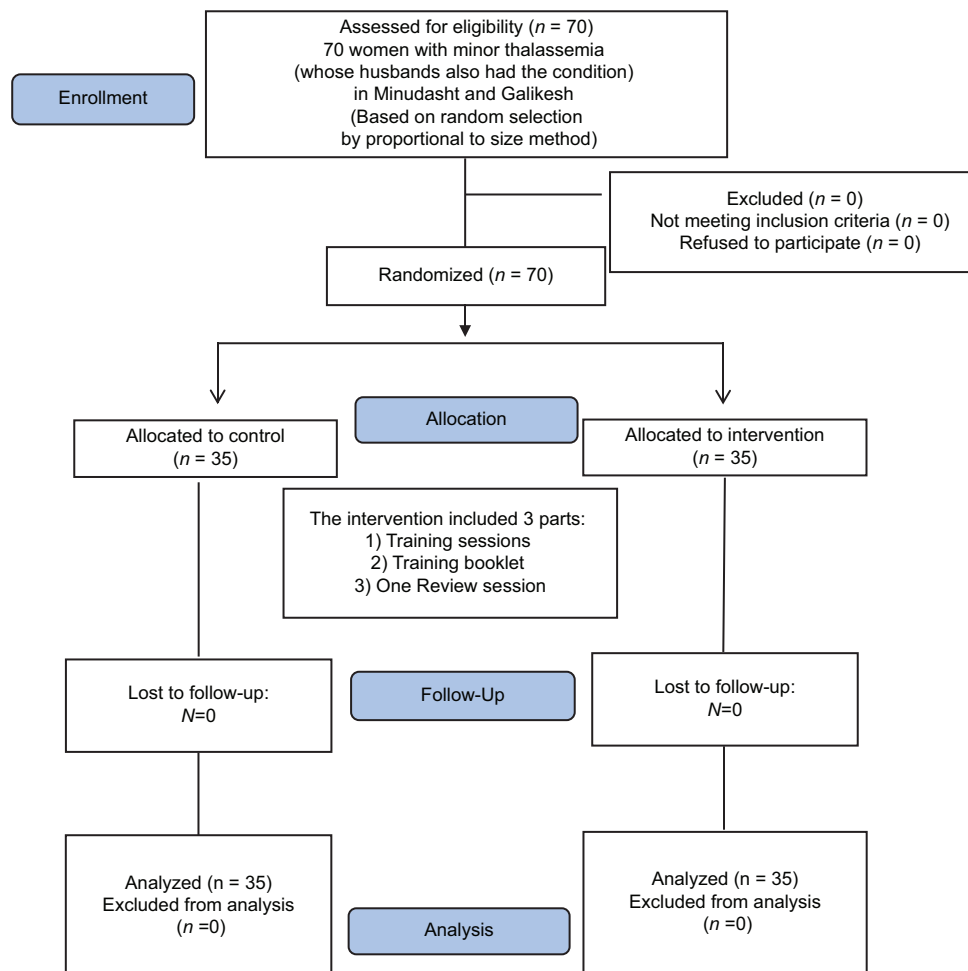


Figure 1: Consort diagram of the study

pregnancies, history of using the contraceptive method, contraceptive method, and economic status.

Part B

The second part consisted of 73 items measuring the fertility behavior and related constructs of TPB (attitudes, subjective norm, and PBC) of women with minor thalassemia based on Ajzen guidelines.

The questionnaire was developed by a semi-structured interview with 16 women with minor thalassemia. The interview was conducted with a broad in-depth question related to the woman's individual experience of pregnancy/pregnancies, and thereafter, a semi-structured schedule was employed to address further questions based on the structures of the TPB. The aim of the interviews was deciding on the key questions to be used in the questionnaire. The fertility behavior was defined as "pregnancy and family planning, somehow those women, who use contraceptive method but are eligible for childbearing, withdraw their contraceptive method, and women who are not eligible for childbearing (because of aging or sufficient number

of babies or specific diseases) choose an appropriate contraceptive method." We defined attitude as a belief in the advantages of childbearing, subjective norm as the normative belief of significant influences, and PBC as factors obstructing childbearing. TPB questionnaire including five subscales.

Attitude (22 items): behavioral beliefs and outcome evaluations, subjective norm (27 items): normative beliefs and motivation to comply, PBC (19 items): control beliefs and their perceived power to influence behavior, intention (3 items), and fertility behavior (2 items). The items were scored on a five-point Likert's scale, ranging from "strongly agree,"^[5] to "strongly disagree,"^[11] for example, Attitude: Since I have thalassemia, trying to get pregnant is wrong; PBC: I am sure if my family supports me, I can plan my pregnancy; and Subjective norm: My mother-in-law expects me to get pregnant. The content validity was evaluated quantitatively and qualitatively. In qualitative evaluation, an interview was conducted with some experts. Then, Content Validity ratio = 0.84 and Content Validity Index = 0.88 were calculated in quantitative.

We assessed internal consistency and stability to determine the validity of the constructed questionnaire. Internal consistency was evaluated by Cronbach's α coefficient, in which 0.7 or above was considered satisfactory. Cronbach's α coefficient was 0.79. We assessed the stability of scale with test-retest and intraclass correlation coefficient (ICC). Moreover, a subsample of women ($n = 15$) completed the questionnaire twice with a 2-week interval to examine the stability of the scale by calculating ICC, where the ICC of 0.4 or above was considered acceptable. The study was single-blind, therefore, the statistical analyst was not aware of the interventional program in each participant.

Educational intervention

The training program was presented by the researcher. Sampling was done to accessible and continuous. The researcher obtained authorities' permission from the participants for the study and filled the questionnaire with an interview. After data analysis, educational intervention was designed through focus group including health policy-makers, health providers, and the participants' representative. The control group only received educational program as usual. Intervention was conducted at Minudasht health centers. The confidentiality of the information was assured to the participants. Educational program based on TPB was conducted in three study groups (each containing 17 participants). The participants who had inclusion criteria were invited during sessions, and most of the questions were answered through group discussion. The quiz tests were conducted in the sessions and giving gifts was considered to increase their motivation. The educational content is selected based on the resources and guidelines in the health system. The content of the material included the necessity and importance of thalassemia and its screening, the importance of childbearing, the timing of pregnancy, obstacles and facilitators of fertility, and the correction of false beliefs. Methods of modulating the TPB were used based on the structures in the sessions [Table 1].

During the sessions, women's attitudes and beliefs about thalassemia and childbearing were discussed in group discussions. An educational booklet was prepared and distributed among participants in the study group. An interventional program was designed for 4 weeks in 8 sessions, weekly 2 sessions (90 min each session), and a lesson plan was developed for each session. At the end of the eighth session, an educational booklet including the training content of thalassemia and childbearing was provided by the researcher for the women, and one session was held for individuals effective in women's decision-making as already determined in the pretest (participants' spouses, their mothers, and their mother-in-law). Thalassemia and

Table 1: Methods of modulating the structures of theory of planned behavior

The structures of TPB	Methods/materials
Attitudes	Brainstorming Question and answer
Subjective norm	Role-playing Panel discussion Discussion
Perceived behavioral control	Discussion on facilitators Encouragers Patterns of the role of desirable behavior
Behavior	Role models

TPB=Theory of planned behavior

fertility complications were shown in a film, and the participants were given examples of those involved in such complications, and in this way, the researcher tried to change the participants' attitude. The participants who had babies with major thalassemia were invited in the sessions and they expressed the wrong behaviors leading to this situation and discussed the challenges and experiences. For those absent in the sessions, face-to-face education was provided. After 3 months, posttest was conducted, and the TPB questionnaire was filled for both groups.

Statistical analysis

Normality of distribution of quantitative variables was tested using the Kolmogorov-Smirnov test. Statistical analysis was performed using SPSS (version 16, Chicago, IL, USA) and descriptive statistics, independent *t*-test, paired *t*-test, Chi-square test, Mann-Whitney test, and Wilcoxon test. The significance level in this study was considered to be $P < 0.05$.

Results

Two groups were homogeneous in terms of education (woman, husband), occupation education (woman, husband), time of marriage, history of thalassemia abortions, history of unexpected pregnancies, and contraceptive method using Chi-square test, and it showed that there were no significant differences between the two groups ($P > 0.05$) [Table 2].

Based on the Kolmogorov-Smirnov test, all constructs of TPB, except the intention and behavior, were normal. Therefore, the used tests were independent *t*-tests (between groups) and paired *t*-tests (in group) to compare normal structures with Mann-Whitney test (between groups) and Wilcoxon test (in group). Independent *t*-test showed no significant difference in the mean age of control and study groups (31.08 [6.66] and 30.69 [6.20] years, respectively). The findings showed that most of the participants in the control (85.71%) and study (91.43%) groups were homemakers.

The two groups were homogeneous in terms of age ($P = 0.796$), gravida ($P = 0.676$) and number of living child ($P = 0.222$), based on independent t -test, baby with major thalassemia ($P = 0.683$), abortions ($P = 0.199$), and number of abortions because of major thalassemia ($P = 0.736$), (Mann–Whitney test) [Table 3].

Table 2: Frequency distribution of education, occupation, time of marriage, previous abortion, previous unwanted pregnancy, using contraceptive method, child with major thalassemia, and contraceptive method in two groups

Variables	Group	Control, n (%)	Study, n (%)	P
Education	Primary	10 (28.8)	14 (40)	0.448
	High school	11 (31.40)	7 (20)	
	Diploma ≤	14 (40)	14 (40)	
Occupation	Homemaker	30 (85.71)	32 (91.43)	0.452
	Employed	5 (14.29)	3 (8.57)	
Time of marriage (year)	1 ≥	3 (8.6)	1 (2.9)	0.462
	2-4	1 (2.9)	3 (8.6)	
	5-7	3 (8.6)	5 (14.3)	
	7 ≤	28 (80)	26 (74.3)	
Previous abortion (because of major thalassemia)	Yes	9 (25.7)	8 (22.9)	0.780
	No	26 (74.3)	27 (77.1)	
Previous unwanted pregnancy	Yes	4 (11.43)	5 (14.28)	0.721
	No	31 (88.57)	30 (85.72)	
Using contraceptive method	Yes	25 (71.4)	20 (57.1)	0.212
	No	10 (28.6)	15 (42.9)	
Child with major thalassemia	Yes	11 (31.43)	12 (34.28)	0.799
	No	24 (68.57)	23 (65.72)	
Contraceptive method	Nothing	13 (37.1)	14 (40)	0.757
	Pills	5 (14.3)	7 (20)	
	Ampule	2 (5.7)	1 (2.9)	
	IUD	0 (0)	1 (2.9)	
	Condom	2 (5.7)	3 (8.6)	
	Withdrawal	13 (37.1)	9 (25.7)	

IUD=Intrauterine device

Table 3: Comparison of mean age, gravida, living child, abortion, and abortion (because of major thalassemia) in two groups

Variables	Mean±SD		Test* Independent sample t-test
	Control	Study	
Age	31.08±6.66	30.69±6.20	$t=-0.260, P=0.796$
Gravida	2.48±1.75	2.65±1.66	$t=0.420, P=0.676$
Living child	1.63±1.65	2.11±1.38	$t=1.585, P=0.222$
Variables	Median (interquartile range)		Test** Mann-Whitney
	Control	Study	
Abortion	<0.001 (1.00)	<0.001 (1.00)	$Z=-0.285, P=0.199$
Abortion (because of major thalassemia)	<0.001 (1.00)	<0.001 (0.00)	$Z=-0.337, P=0.736$

*The variables with normal distribution were described by mean±SD and compared with Student t -test, **The abnormal variables are described with the median (interquartile range) and compared with Mann-Whitney test. SD=Standard deviation

The results of independent t -test and Mann–Whitney test showed that there was no statistically significant difference between mean scores of attitudes toward behavior, subjective norms, and PBC before intervention between two groups ($P > 0.05$), but there was a significant difference in the two groups after intervention ($P < 0.001$) [Table 4]. In addition, according to the paired test and Wilcoxon test, there was no statistically significant difference in mean scores of intention and behavior (before intervention) in the two groups ($P > 0.05$), but there was a significant difference in the two groups after intervention ($P < 0.001$) [Table 4]. Analysis of covariance by controlling variables such as ethnicity and spouse education before intervention showed an increase of 65 scores in behavior of the study group compared to that of the control group after the intervention, which was statistically significant ($P < 0.001$) [Table 5].

Discussion

This study aims to explore the impact of education based on TPB on fertility behavior of minor thalassemia couples. The educational program based on TPB significantly increased awareness and positive attitude to appropriate fertility behavior in women with minor thalassemia leading to strengthening PBC, changing subjective norms, and intention to fertility them, so it changed fertility behavior of the women. Therefore, comparison of pretest and posttest results showed significant differences in both intervention and control groups. Chae *et al.* carried out a similar study on influencing factors on fertility intention of university student women based on TPB in 2016. He demonstrated that the TPB is useful to explain fertility intentions.^[29]

In this study, the mean score of attitude was significantly increased after intervention in the study group, which is consistent with the results of Molaei-Zardanjani *et al.* and Darabi *et al.*^[30,31] Molaei-Zardanjani *et al.* showed that education based on TPB is effective on attitude, subjective norms, PBC, and intention related to women’s behavior (performing mammography).^[30] Darabi *et al.* demonstrated that theory-based educational intervention reduces the high-risk behaviors related to sexual and reproductive health between adolescent girls.^[31] In line with our study, Baniaghil and Khoddam study (2005) showed that education^[32-34] and subjective norms (influential people) are among the most important factors for behavior in society. They induce individuals what to do and what not to do. Subjective norms were spouse and his families in this study, that is, consistent with Sarayloo *et al.*, but Jaihouni and Hazavehee found that influential people were health providers, physicians, and families, sequentially.^[34,35]

Similar to our study, Shahraki *et al.* (2014) studied the effect of education based on TPB on the choice of

Table 4: Mean score of attitude, subjective norms, perceived behavioral control, and intention and behavior in both groups before and after the intervention

Variables	Group	Mean±SD		Paired t-test*	
		Before the intervention	After the intervention	t	P
Attitude	Control	49.65±5.16	52.51±9.83	1.603	0.118
	Study	50.85±6.77	71.08±4.01	16.136	<0.001
Independent t-test*	t	0.833	10.342		
	P	0.408	<0.001		
Subjective norms	Control	29.47±8.84	29.63±9.47	-0.138	0.891
	Study	32.81±10.72	65.71±10.35	-12.581	<0.001
Independent t-test	t	1.425	15.212		
	P	0.159	<0.001		
Perceived behavioral control	Control	33.82±9.06	36.34±13.35	-1.179	0.247
	Study	37.94±9.67	61.02±4.74	-13.180	<0.001
Independent t-test	t	1.836	10.297		
	P	0.071	<0.001		

Variables	Group	Mean±SD		Wilcoxon test**	
		Before the intervention	After the intervention	Z	P
Behavioral intention	Control	28±7.37	32.38±17.72	-1.221	0.222
	Study	31.62±40.64	65.52±9.36	-5.129	<0.001
Mann-Whitney**	Z	1.653	9.784		
	P	0.103	<0.001		
Behavior	Control	20±40.58	22.86±45.83	0.577	0.564
	Study	28.57±45.83	91.42±28.40	-4.690	<0.001
Mann-Whitney	Z	-0.830	-5.755		
	P	0.406	<0.001		

*The constructs of TPB with normal distribution were described by mean±SD and compared with Student t-test, **The abnormal variables are described with the median (interquartile range) and compared with Mann-Whitney test. TPB=Theory of planned behavior, SD=Standard deviation

Table 5: The result of the analysis of variance on efficacy of education based on theory of planned behavior

Construct of TPB	The regression coefficient	SD	t	P
Behavior				
Study group	65	7.623	8.531	<0.001
Control group	0	-	-	-
Before	0.413	0.089	4.641	<0.001

Before intervention, the variables of ethnicity and spouse education were controlled for behavior. TPB=Theory of planned behavior, SD=Standard deviation

delivery method in pregnant women and hence she showed that health education models including TPB are effective in attitudes, subjective norms, and people's intention to change their behavior,^[36] but the findings of Ishaq *et al.* are different. They investigated the effect of sociodemographic factors on family planning among parents of children with thalassemia, then they showed that most of the parents had tendencies to have more babies despite facing a lot of problems regarding thalassemia treatment (such as, frequent blood transfusions, chelation, and psychosocial issues) and risk of having babies with thalassemia in future pregnancies. Maybe because of traditional and social pressures in the population who believe that woman's worth is determined by the number of babies and contribution of the babies in the family economy. They

concluded that having a baby with thalassemia does not affect the fertility despite the high level of awareness and accessibility to family planning methods.^[26] Kosaryan *et al.* reported that 50% of Iranian couples with minor thalassemia had undesirable fertility behavior including unwanted pregnancies, abortions without PND, and babies with major thalassemia. They suggested that continuous and periodic training programs help to improve the fertility behavior in couples with minor thalassemia.^[24] The subjective norms are important in our culture, and the couples with minor thalassemia have inappropriate fertility behavior because of their attitude, so it seems that continuous interventional program based on the educational theories and models has an important role in preventing and controlling thalassemia, eventually leading to improvement in quality of health in mothers and babies. It is recommended that health providers apply the education based on TPB to change the attitude toward behavior, subjective norms, PBC, intention, and fertility behavior of women, especially in premarriage counseling classes in couples with minor thalassemia. One of the strengths of this research was the comparison of control and study groups of similar socioeconomic context, and consequently, its high degree of generalizability. Another one, this intervention is implemented in urban and rural areas and among women with minor thalassemia (whose husbands also had the condition). Thus, we can generalize the results

to other families in other areas. Another strong point is the interventional program, which includes peer education, distribution of booklets, and participation of mothers who have babies with major thalassemia, which improved the fertility behavior.

One of the limitations of this study was the role of psychological factors that were not assessed. There is no study on the psychological factors affecting the fertility behavior of minor thalassemia couples. Future researches are needed to perform with participation of parents, advisors, and community-based organizations to address the strategy for solving the psychological factors. Another one, this study was carried out with participation of women with minor thalassemia and hence it is suggested that the research should be performed on the participation of both women and men (couples).

Conclusion

Determining the factors influencing decision-making is very important to design an effective educational intervention. This study demonstrates the importance of the context (subjective norms, obstacles, and facilitate to behavior) on change of behavior. In addition, all of the TPB constructs played a pivotal role in improving the womens' fertility behavior with minor thalassemia.

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Conflicts of interest

There are no conflicts of interest.

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