

Relationship of Informed Choice about Fetal Anomaly Screening with Worry and Anxiety in Pregnant Women

Masoumeh Kordi (MSc)^{1,2}, Sahar Riyazi (MSc)^{3*}, Marzieh Lotfalizade (MD)⁴, Mohamad Taghi Shakeri (PhD)⁵

¹ Assistant Professor, Evidence-Based Care Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

² Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

³ MSc of Midwifery, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran

⁴ Associate Professor, Department of Obstetrics and Gynecology, Faculty of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran

⁵ Professor, Department of Biostatistics, School of Health, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO	ABSTRACT
<p><i>Article type:</i> Original article</p>	<p>Background & aim: The purpose of prenatal screening programs during pregnancy is to empower the women to make an informed choice and reduce the uncertainty in decision making. However, the screening itself may cause worry and anxiety in the pregnant females. This study aimed to investigate the relationship of the informed choice in the pregnant females about fetal anomaly screening with worry and anxiety.</p> <p>Methods: This cross-sectional study was conducted on 160 pregnant females, who referred to the healthcare centers of Mashhad, Iran in 2014. The data collection was performed using the individual-pregnancy information and informed choice questionnaires, Cambridge Worry Scale, and Spielberger's Anxiety Inventory. The data were analyzed using the Chi-square test, Spearman correlation coefficient, and logistic regression through SPSS version 16. The P-value less than 0.05 was considered statistically significant.</p> <p>Results: Out of the 160 pregnant females participating in this study, 85.6% (n=137) and 14.4% (n=23) of them had informed and uninformed choices about the screening tests, respectively. Based on the logistic regression analysis, pregnant women's informed choice had no statistically significant relationship with worry (P=0.44), state anxiety (P=0.43), and trait anxiety (P=0.92).</p> <p>Conclusion: The process of informed choice is a very important part regarding the screening of fetal anomalies in pregnancy. Therefore, practitioners and midwives must ensure that the pregnant females have informed choice for these tests. As a result, their choice would have the highest level of satisfaction and the lowest amount of anxiety.</p>
<p><i>Article History:</i> Received: 02-Nov-2015 Accepted: 06-Nov-2016</p>	
<p><i>Key words:</i> Anxiety Chromosomal abnormalities Informed consent Prenatal screening Worry</p>	

► Please cite this paper as:

Kordi M, Riyazi S, Lotfalizade M, Shakeri M T. Relationship of Informed Choice about Fetal Anomaly Screening with Worry and Anxiety in Pregnant Women. Journal of Midwifery and Reproductive Health. 2017; 5(2): 867-872. DOI: 10.22038/jmrh.2017.8153

Introduction

Prenatal screening as part of the routine prenatal care is recommended to pregnant women in many countries (1). According to some prestigious scientific institutions, all pregnant women should be offered to undergo such screening tests as Down syndrome, Edward syndrome, and open neural tube defects regardless of age factor (2). These institutions include the American Congress of Obstetricians and Gynecologists, Society of Obstetricians and

Gynecologists of Canada, Canadian College of Medical Genetics, the UK National Institute for Health and Clinical Excellence, and the screening protocol administered in Iran.

Nevertheless, many of the health professionals are opposed to recommend screening tests to the pregnant women since they believe that suggesting these tests may increase the anxiety in this population because they think that their fetuses may have anomaly (3). Suggesting these

* Corresponding author: Sahar Riyazi, MSc of Midwifery, Department of Midwifery, School of Nursing and Midwifery, Mashhad University of Medical Sciences, Mashhad, Iran. Email: sahar.riyazi@yahoo.com

test by the doctor or midwife exposes the pregnant mother and her family to a difficult condition for decision-making. Since the screening tests can lead to decisions about diagnostic tests and also abortion, the health professionals have emphasized to fall this decision on the families (4).

The purpose of the prenatal screening programs is enabling the people to make an informed choice and reducing the uncertainty and ambiguity in decision-making regarding performing the test (5). However, in a study conducted by Green et al. (2004), they found that an informed choice related to the screening tests led to higher anxiety level and less satisfaction with the decision (6); therefore, the effect of informed choice is ambiguous. The informed choice is acceptable only when the females receive adequate information and are not under any pressure (7). Researchers have shown that increased knowledge and information affect a person's ability to identify key and important issues and lead to increased understanding and positive attitudes (8, 9).

On the other hand, the lack of knowledge results in anxiety, which has adverse effects on the decisions in this regard (10). Given the importance of mental health during pregnancy, the pregnant women should be able to decide with higher capacity about undergoing the prenatal screening and diagnostic tests, which leads to have the lowest levels of anxiety and costs (11).

Since the knowledge and awareness of the pregnant women are considered as the main elements of the informed choice about screening tests (12), equipping them with sufficient information can be associated with better mental management (13).

In a study carried out by Van den Berg et al. (2005), no significant relationship was found between the informed choice and anxiety in the pregnant women (5). Similarly, in a study conducted by Rowe et al. (2006), there was no statistically significant difference between the pregnant women who had informed choices about performing prenatal genetic screening and those who had non-informed choices in terms of their level of anxiety and depression (14). Likewise, Michie et al. (2002) concluded that the level of anxiety was not significantly different between the pregnant women who performed the screening tests informed and

those taking the tests non-informed (15).

However, in a study carried out by Green et al. (2004), the informed choices of pregnant women about undergoing the screening tests were associated with higher anxiety levels (6). Regarding these contradictory research findings and lack of any study investigating this issue in Iran, the present study was performed to investigate the relationship of the informed choice about performing the prenatal chromosomal screening tests with anxiety and worry in the pregnant women.

Materials and Methods

This cross-sectional study was conducted on 160 pregnant women at Mashhad, Iran in 2014. The present study was approved by the Research Ethics Committee of the Mashhad University of Medical Sciences. The study began after obtaining an introduction letter from the School of Nursing and Midwifery and submitting it to the authorities of healthcare centers. In line with the ethical codes, the researchers explained the objectives of the study to the pregnant women and obtained their written consents; subsequently, the sampling was carried out.

The sample size was calculated as 160 subjects based on a pilot study on 10 pregnant women and using the correlation coefficient formula with test power of 80% and confidence level of 95%. For the purpose of data collection, one of the health centers in Mashhad was randomly selected. Subsequently, the participants were selected from the pregnant women referring to this healthcare center using convenience sampling method.

The data were collected using several research instruments including the individual-pregnancy information and informed choice questionnaires, the Cambridge Worry Scale, as well as the Spielberger's Anxiety Inventory. The participants filled out these tools at 20-22 weeks of pregnancy, and if necessary, they were given some explanations about the questions by the researcher. The informed choice was measured qualitatively and the anxiety and worry were measured quantitatively.

The informed choice questionnaire was employed from a study conducted by Marteau et al. (2001) in England (16). This questionnaire consists of three subsections including knowledge,

attitude, and behavior of the pregnant women about performing fetal abnormality screening tests during pregnancy. The section related to knowledge entails 16 items, which are prepared based on valid books and articles about the fetal anomaly screening and diagnosis. Giving the correct response to more than 8 items represents good awareness, and obtaining 8 or less scores indicates poor awareness.

The attitude section, including 4 items, is scored from 1-7 with the minimum and maximum scores of 4 and 28, respectively. The median score in this section is 16, which indicates a neutral attitude, i.e., the scores higher and lower than the median score represent the positive and negative attitudes, respectively. The behavior section includes two Yes-No questions enquiring whether the subject choose to perform the screening tests or not based on the results recorded in the laboratory.

The criteria of the informed choice for the pregnant mother were defined as follows: 1) good knowledge, positive attitude, and performing the screening tests and 2) good knowledge, negative attitude, and not performing the screening tests. The criteria of the non-informed choice were defined as follows: 1) good knowledge, negative attitude, performing the screening tests, 2) good knowledge, positive attitude, not performing the screening tests, 3) poor knowledge, positive attitude, performing the screening tests, 4) poor knowledge, negative attitude, performing the screening tests, 5) poor knowledge, positive attitude, not performing the screening tests, and 6) poor knowledge, negative attitude, and performing the screening tests.

The Cambridge Worry Scale was obtained from a study conducted by Green et al. (2004) (6). This scale contains 16 items assessing the rate of worry in relation to various issues of pregnancy. This tool is rated on 6-point Likert scale (i.e., 0: not worried to 5: severely worried). The minimum and maximum scores in this scale were zero and 80, respectively. The Spielberger's State-Trait Anxiety Inventory contains 40 items measuring the state (20 items) and trait anxiety (20 items). This inventory is rated on a 4-point Likert scale (i.e., very low to very much).

The validity of all the research instruments was determined using content validity. These tools were prepared by studying the latest books

and research papers in this field, and then given to some experts and professors for evaluation. The reliability of the informed choice questionnaire, Cambridge Worry Scale, and Spielberger Anxiety Inventory was estimated using Cronbach's alpha coefficient, which were 0.78, 0.90, 0.82, respectively.

The inclusion criteria entailed: 1) Iranian nationality, 2) having at least the basic education, 3) no history of undergoing fetal chromosomal abnormality screening or diagnostic tests, 4) performing first trimester screening tests, and 5) not being a health care worker. On the other hand, the exclusion criteria included the history of mental diseases over the past one year (mental diseases diagnosed by a psychiatrist) and the occurrence of major stressful or traumatic events during pregnancy (e.g., death of first-degree relatives, intense family disputes, financial problems, and major changes in life status).

The data were analyzed using the descriptive statistics (i.e., mean, standard deviation, frequency distribution, etc.), Chi-square test, Spearman correlation coefficient, and logistic regression through SPSS version 16. The P-value less than 0.05 was considered statistically significant.

Results

According to the results of the study, the mean age of the participants was 27.57±5.2 years. Furthermore, 150 pregnant women (93.8%) lived in the urban areas, 85 subjects (53.1%) had high school and diploma, and 108 (67.5%) participants were housewives. In addition, the husbands of 111 (69.4%) participants were self-employed, 130 (54.2%) subjects did not have any family relationship with their husbands, and 141 (88.1%) cases had wanted pregnancy. The mean and standard deviation of the participants' worry, state anxiety, and trait anxiety are illustrated in Table 1.

Table 1. Mean and standard deviation of worry, state anxiety, and trait anxiety in the pregnant women

Variables	Mean	SD
Worry	18.51	8.49
State anxiety	46.28	3.61
Trait anxiety	46.3	4.36

Out of the 160 pregnant women participating in this study, 85.6% (n=137) and 14.4% (n=23)

of them had informed and non-informed choices about the prenatal screening tests.

Also, for one unit increase in the score of worry in pregnant women, the ratio of informed choice is 1.017 times more than the non-informed choice, and for one unit increase in the score of state

anxiety, the ratio of informed choice is 1.042 times than non-informed choice, and for one unit increase in the score of trait anxiety, the ratio of informed choice is 1.004 times than non-informed choice that is shown in Table 2.

Table 2. Results of logistic regression analysis to assess the relationship of informed choice with worry, state anxiety, and trait anxiety in pregnant women

Variables	P	Odds ratio	Confidence interval (CI)
Worry	0.44	1.017	0.97-1.06
State anxiety	0.43	1.042	0.94-1.15
Trait anxiety	0.92	1.004	0.92-1.09

According to the Spearman correlation coefficient, there was a positive correlation between the participants' level of education ($r=0.213$, $P=0.007$) and informed choice. However, no statistically significant relationship was observed between other demographic variables and the informed choice about prenatal screening tests ($P>0.05$).

Discussion

As the findings of the present study indicated, approximately 86% of the pregnant women had informed choice about performing the fetal chromosomal abnormality screening tests. This rate is almost similar to those reported by Van den Berg et al. (2005) and Jaques et al. (2005) in which 68% and 74% of the participants had informed choices about the prenatal screening tests (5, 17). Nevertheless, in the studies conducted by Rowe et al. (2006), Dormandy et al. (2006), and Gourounti et al. (2008), 37%, 43.5%, and 44% of the subjects had informed choice about the Down syndrome screening (14, 18, 19). This discrepancy in the frequency of the informed choice during pregnancy reported in the aforementioned studies may be due to the cultural, social, economic, and racial differences of the study populations, health providers' knowledge and skills and the way they provide information, the knowledge and attitude of the pregnant women about the prenatal screening tests, as well as their beliefs about these tests.

The results showed no significant relationship between the informed choice about the prenatal screening tests and anxiety in the pregnant women. In a study carried out by Rowe et al. (2006), it was found that the amount of

depression and anxiety about the genetic screening tests was not different between the women who had informed choice and those with poor informed choice (14). Furthermore, in a study conducted by Hewison et al. (2001), no statistically significant relationship was found between the knowledge and public anxiety scores during pregnancy (20). Similarly, Michie et al. (2002) concluded that there is no relationship between the informed choice of pregnant women about Down syndrome screening and anxiety level (15), which is consistent with the results of the present study.

Awareness is an important aspect of informed choice; accordingly, providing the pregnant women with the necessary information and increasing their awareness can be associated with better mental management (13). However, some researchers believe that increased awareness about the prenatal screening tests, false negative and positive results in these tests, fetal risks, and diagnostic tests can be an important factor in increasing the anxiety level in some pregnant women (6, 21). Accordingly, in a study conducted by Green et al. (2004), the informed choice about the prenatal screening tests was associated with higher levels of anxiety in the pregnant women, which is inconsistent with the findings of the present study (6). This disagreement can be ascribed to the employment of different research tools for anxiety assessment and also the cultural-social differences between the participants of the two studies. Furthermore, the present study evaluated the state-trait anxiety of the pregnant women; however, Green et al. evaluated the level of anxiety about the prenatal genetic screening tests.

The results showed no statistically significant relationship between the informed choice about the screening tests and worry in the pregnant women. Inconsistent with the findings of the present study, Hewison et al. (2001) reported a significant relationship between the knowledge and worry using a 16-item questionnaire assessing the worry about pregnancy and childbirth (20). This discrepancy can be due to the use of different research instruments for worry assessment and also cultural-social differences between the participants of the two studies. The present study was conducted to investigate general concerns of the pregnant women; however, Hewison et al. examined the general concerns of the mothers about pregnancy, childbirth, fetal abnormalities, and worry about the risks associated with screening and diagnostic tests.

The results of the present study revealed a significant relationship between the pregnant women's education level and informed choice. Likewise, Van den Berg et al. (2005), Jaques et al. (2005), and Gourounti et al. (2008) reported a significant relationship between the participants' education level and informed choice; in other words, higher education level was associated with higher rate of informed choice. This may be due to the positive relationship between level of education and awareness (5, 17, 19).

One of the limitations of this study was that the pregnant women's physical and mental conditions at the time of completing the questionnaires may have affected their responses. Another limitation was that the subjects selection was not performed randomly, which limits the generalizability of the findings to the entire community.

Conclusion

According to the screening protocol administered in Iran, performing fetal anomaly screening tests should be recommended to all pregnant women. The informed choice process is a very important part of fetal anomaly screening tests during pregnancy (22). Therefore, the clinicians and midwives should ensure that the pregnant women have informed choice for performing these tests. As a result, their choice would enjoy the highest level of satisfaction and the lowest level of worry and anxiety.

Acknowledgements

This article is part of a thesis submitted for the partial fulfillment for the requirement of a Master's degree in Midwifery at Mashhad University of Medical Sciences (code NO.: 922882). Hereby, the researchers of the current study would like to express their gratitude to the Research Deputy of Mashhad University of Medical Sciences for their financial support and all the women who participated in this study.

Conflicts of interest

The authors declare no conflicts of interest.

References

1. Kleinveld JH, Timmermans DR, de Smit DJ, Ader HJ, van der Wal G, ten Kate LP. Does prenatal screening influence anxiety levels of pregnant women? A longitudinal randomised controlled trial. *Prenatal Diagnosis*. 2006; 4(26):354-361.
2. Gametes, Science Bulletin. A step towards providing a national protocol of prenatal screening in Iran; 2011. Available at: URL: <http://www.google.com/gws/rd/ss;2016> (Persian).
3. Van den Berg M, Timmermans DR, Kleinveld JH, Garcia E, Van Vugt JM, Van der Wal G. Accepting or declining the offer of prenatal screening for congenital defects: test uptake and women's reasons. *Prenatal Diagnosis*. 2005; 25(1):84-90.
4. Kleinveld JH. Psychological consequences of prenatal screening. Amsterdam: VU University Amsterdam; 2008.
5. van den Berg M, Timmermans DR, Ten Kate LP, van Vugt JM, van der Wal G. Are pregnant women making informed choices about prenatal screening? *Genetics in Medicine*. 2005; 7(5):332-338.
6. Green JM, Hewison J, Bekker HL, Bryant LD, Cuckl HS. Psychosocial aspects of genetic screening of pregnant women and newborns: a systematic review. *Health Technology*. 2004; 8(33):5-8.
7. Office of Population Health Genomics DOH Policy. Department of Health Policy recommendation: Model of Best Practice for Prenatal Screening Choices. Australia: Government of Western Australia Department of Health; 2010.
8. Lewis J, Leach J. Discussion of socio-scientific issues: the role of science knowledge. *International Journal of Science Education*. 2006; 28(11):1267-1287.
9. Prokop P, Leskova A, Kubiátko M, Diran C. Slovakian students knowledge of and attitudes toward biotechnology. *International Journal of Science Education*. 2007; 29(7):895-907.
10. Abedian Z, Navee M, Jaafari Sani H, Arani A, Ebrahimzadeh S. Comparing the effect of two teaching methods, role playing and lecture on

- primigravida women's knowledge, attitude and performance according to delivery mode. *Iranian Journal of Obstetrics, Gynecology and Infertility*. 2012; 15(1):26-34 (Persian).
11. Thornton JG, Hewison J, Lilford RJ, Vail A. A randomised trial of three methods of giving information about prenatal testing. *BMJ*. 1995; 311(39):1127-1130.
 12. Dormandy E, Hooper R, Michie S, Marteau TM. Informed choice to undergo prenatal screening: a comparison of two hospitals conducting testing either as part of a routine visit or requiring a separate visit. *Journal of Medical Screening*. 2002; 9(3):109-114.
 13. Dahl K, Hvidman L, Jorgensen FS, Kesmodel US. Knowledge of prenatal screening and psychological management of test decisions. *Ultrasound in Obstetrics & Gynecology*. 2011; 38(2):152-157.
 14. Rowe HJ, Fisher JR, Quinlivan JA. Are pregnant Australian women well informed about prenatal genetic screening? A systematic investigation using the Multidimensional Measure of Informed Choice. *Australian and New Zealand Journal of Obstetrics and Gynaecology*. 2006; 46(5):433-439.
 15. Michie S, Dormandy E, Marteau TM. The multi-dimensional measure of informed choice: a validation study. *Patient Education and Counseling*. 2002; 48(1):87-91.
 16. Marteau TM, Dormandy E, Michie S. A measure of informed choice. *Health Expectations*. 2001; 4(2):99-108.
 17. Jaques AM, Sheffield LJ, Halliday JL. Informed choice in women attending private clinics to undergo first-trimester screening for Down syndrome. *Prenatal Diagnosis*. 2005; 25(8):654-664.
 18. Dormandy E, Michie S, Hooper R, Marteau TM. Informed choice in antenatal Down syndrome screening: a cluster-randomised trial of combined versus separate visit testing. *Patient Education and Counseling*. 2006; 61(1):56-64.
 19. Gourounti K, Sandall J. Do pregnant women in Greece make informed choices about antenatal screening for Down's syndrome? A questionnaire survey. *Midwifery*. 2008; 24(2):153-162.
 20. Hewison J, Cuckle H, Baillie C, Sehmi I, Lindow S, Jackson F, et al. Use of videotapes for viewing at home to inform choice in Down syndrome screening: a randomised controlled trial. *Prenatal Diagnosis*. 2001; 21(2):146-149.
 21. Statham H, Green J. Serum screening for Down's syndrome: some women's experiences. *British Medical Journal*. 1993; 307(6897):174-176.
 22. Wildschut HI, Weiner CP, Peters TJ. *When to screen in obstetrics and gynecology*. 2nd ed. Philadelphia: Elsevier Health Sciences; 2006.