

Effect of Counseling Regarding Non-Invasive Prenatal Screening Tests on Pregnant Woman's Knowledge, Attitude and Anxiety

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Abstract: Options for prenatal screening have been progresses in recent years. It is important that pregnant women are well informed about benefits and risk of screening. Aim of the study: to evaluate the effect of regarding non-invasive prenatal screening tests counseling on pregnant woman's knowledge, attitude and anxiety. A quasi experimental research design was used. A purposive sample technique was used to recruit 335 pregnant women. The present study was conducted at antenatal clinics and inpatient units for high risk pregnancy at Ain shams University Maternity Hospital. Four tools of data collection were used (Non-invasive Prenatal Screening Structured Arabic Interview Questionnaire Sheet, Non-invasive Prenatal Screening Likert scale, Pregnancy-Related Anxiety Questionnaire- Revised and Pregnant women satisfaction with counseling process). Results: shows that there was no statistical significant difference between control and intervention group regarding their knowledge and attitude before intervention. While, there was a highly statistical significant improvement on intervention group knowledge immediately after intervention and at follow up after 4 week. Furthermore, there was a highly statistical significant improvement on intervention group positive attitude immediately after intervention and at follow up after 4 week. In addition, anxiety of pregnant women on intervention group was significantly lower after counseling. Conclusion: the findings of the current study supported the hypothesis of this study which stated that pregnant women who had counseling have significant improvement on their knowledge, their positive attitude regarding non-invasive prenatal screening tests and their anxiety was reduce after counseling than pregnant women who received routine care.

Keywords: Counseling, Non-invasive Prenatal Screening, Pregnant Woman's knowledge, attitude and anxiety.

I. INTRODUCTION

Prenatal screening aims to provide timely information to women and their partners about the health of their fetus in order to improve their reproductive choice (Nadya, 2013). The technology of screening for diagnosing congenital diseases and genetic abnormalities in the fetus has rapidly improved. Prenatal screening has an important role in defining high-risk groups that need prenatal diagnostic tests. All pregnant women regardless of their age or family health history may choose to have one of these prenatal screening (Emre, et al, 2012).

Prenatal screening often recognizes as a set of practices aimed to provide pregnant women with helpful information about their unborn babies. Prenatal screening effects on some of most deeply held social, political and ethical beliefs (Vladana, 2015). Benefits of screening during pregnancy include reassurance if shown to be at a low risk enabling clinicians and families to manage pregnancy appropriately, plan for a high-risk delivery, and arrange for postnatal medical care if necessary. Other benefits include reassurance regarding the health of the fetus, planning for palliative care and engaging in early intervention for the fetus (Memnun et al, 2016). On the other hand, possible harms include a false reassurance, decision stress, anxiety especially as a result of false-positive outcomes, and the risk of pregnancy loss (Wybo et al, 2015).

Non-invasive prenatal screening tests that commonly used throughout the world are ultrasound, maternal serum markers, and cell-free fetal DNA (cf-DNA). Ultrasound that performed in first trimester at 10-14 week's gestation to detect Down syndrome by measuring the nuchal translucency (NT) while, on second trimester to detect structural abnormalities such as neural tube defects (NTD). Maternal serum markers that conduct in the first trimester include beta human chorionic gonadotropin (β Hcg) and Plasma Associated Plasma Protein-A (PAPP-A). While, [β Hcg, Alpha fetoprotein (AFP), estriol (E3)] were done on the second trimester. In addition to cell-free fetal DNA (cf-DNA) that circulating in the maternal blood and can be done at 10 weeks of pregnancy to detect fetal chromosomal abnormalities (*Gwen, and Angela, 2015 & Dođa et al, 2016*).

The non-invasive prenatal screening tests (NIPT) have advantageous in that the number of invasive procedures with reduce risk of procedure-related miscarriage, and can performed much earlier in the pregnancy as some studies showing its possibility at 7 weeks of gestation. A recent systematic review of seven cohort studies on NIPT showed a high sensitivity of 98.5- 100 with a low false-positive rate of 0-2% (*Sylvia, Lin, and William, 2014*).

Awareness of prenatal screening tests is the most important factor for screening test to be applicable to the community. Women's knowledge and decision regarding prenatal screening tests affected by many factors including educational level, as well as the course of an uncomplicated pregnancy (*Lean et al, 2016*). Evidence reveals that women are often not informed of what can be detected by non-invasive prenatal screening tests, the possible risks of abnormal fetus diagnosis, and the implications of such findings (*Willis et al, 2015*).

Women's knowledge about prenatal screening tests influences their attitude and decision to undergo these tests. On one hand, inadequate understanding of some women may result in rejection of prenatal screening procedures. However, too much information may also cause the women to refuse the investigations. Therefore, inadequate and incorrect explanation of the pre-screening information results in an inadequate knowledge of the screening procedure as well (*Dođa et al, 2016*).

On the other hand, studies about pregnant' women attitudes to maternal serum screening, NT measurement and fetal chromosome abnormalities clarified that they have insufficient knowledge about prenatal screening tests to make informed decisions, and that offering this knowledge reduces pregnant women anxiety (*Mikamoa, and Nakatsuka, 2015*).

Moreover, pregnant women who undergoing prenatal screening tests for fetal abnormalities experience various levels of anxiety that may increase based upon test result (*Lou et al, 2015*). Raised level of anxiety during pregnancy is accompanying with adverse obstetric outcome as preterm labor and low birth weight. Therefore, it is important to avoid it through counseling process that aimed to acquire pregnant women with sufficient knowledge and promote informed choice for test (*Nakic, Kosec, and Gall, 2013*).

The purpose of counseling has been to enable independent, informed decision making by future parents concerning non-invasive prenatal screening tests using an opting in approach (*Ruth, Benjamin, and Patricia, 2015*). Effective counseling consists of health education, decision making support and relationship building. The last function is necessary for supporting the first two counseling functions and could be achieved by showing empathy, understanding and using partnership statements. Health educations topics include offer information about non-invasive prenatal tests that are available. Key component of decision making support include enabling client to find individual meaning in the information given and making psychological feel of the consequences for the future. This support is planned to decrease psychological distress and increase personal sense of control as well as to facilitate independent decision making (*Martin et al, 2015*).

Furthermore, effective counseling can be realized by the "outcome" i.e. an informed, independent decision made by pregnant woman and her partner, and by counseling "process". In counseling process, midwifery nurse assist the informed decision through providing health education and decision-making support while building a good client–relationship. This require nurse midwife to be aware of pregnant woman values regarding non-invasive prenatal screening test of choice and its subsequent consequences. In addition to, focusing moral issues towards testing and the resulting decisions is integral part of decision-making support (*Martin et al, 2015*).

Nurses have a vital role in providing pregnant women with information regarding the purpose, advantages, risks and limitations of prenatal screening testing that enable pregnant women to make informed decisions about whether to accept or refuse tests as a routine part of prenatal care. Furthermore, nurses need to offer safe, effective and culturally appropriate care, including patient education, support, and referral (*Martin et al, 2018*).

Significance of the study:

Pregnancy is a period during which the woman is sensitive in every aspect, and all types of testing may be a cause for anxiety in both parents. The woman needs to be closely counseled and reassured about the limitations and the meaning of non-invasive prenatal screening tests. Therefore, it is important to know how much the patient actually knows.

Now prenatal screening is commonly available to all pregnant women regardless of age. So, it is essential for all pregnant women to know the possible benefits and limitations of non-invasive prenatal screening tests. Studies still show a lack of information provided, inequality of access to information, unmet support and information needs, and limited knowledge of prenatal testing technologies among pregnant women.

Aim of the study:

The present study was conducted to evaluate the effect of counseling regarding non-invasive prenatal screening tests on pregnant woman's knowledge, attitude and anxiety through the following:

- Assessment of pregnant women's knowledge regarding non-invasive prenatal screening tests before counseling.
- Assessment of pregnant women's attitude regarding non-invasive prenatal screening tests before counseling.
- Assessment of pregnant women's anxiety regarding non-invasive prenatal screening tests before counseling.
- Evaluation the effect of counseling regarding non-invasive prenatal screening tests on pregnant woman's knowledge, attitude and anxiety.

Research Hypothesis:

The current study hypothesized that: pregnant women who had counseling regarding non-invasive prenatal screening tests will have more knowledge, positive attitude and less anxiety than pregnant women who received routine care.

II. SUBJECT & METHODS

Research design: A quasi-experimental study design was used.

Setting: The study was conducted at antenatal clinics and inpatient units for high risk pregnancy at Ain shams University Maternity Hospital.

Sample size, type, and technique:

Sample Size: was calculated according to the following statistics formula $n = Z^2 \cdot p(1-p) / d^2$; a sample of 430 women was included in the study, representing 10% of the total high risk pregnancy who attended at the previously mentioned setting in the previous year.

Final sample size was 335 pregnant woman as (23 pregnant women were drop out from intervention group, and 29 pregnant women were drop out from control group. In addition 43 pregnant women were excluded from the study due to modification of pilot study).

Sample Type: A purposive sample was used.

Sample Criteria: The sample was collected using the following criteria:

- Pregnant women able to read and write.
- Pregnant women over the age of 35 years.

Tools of the Study: Four tools were used for data collection related to this study in addition to Arabic supportive material regarding non-invasive prenatal screening tests.

I. **Non-invasive Prenatal Screening Structured Arabic Interview Questionnaire Sheet:** This was constructed by the researcher after reviewing the related literature. It assessed the necessary data which covered the aim of the study. The questionnaire was divided into 3 parts

Part (1): This part assessed women's socio-demographic characteristics as age, educational level, place of residence & occupation.

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Part (2): This part assessed women's current and previous obstetric history.

Part (3): This part assessed women's knowledge regarding non-invasive prenatal screening tests. It was developed by researchers based on study of *Emre et al, 2012 & Sylvia, Lin, and William (2014)*. It consists of 14 items. The response to the items ranged from 2= correct, 1=incorrect. This part was used twice (pre and post counseling).

▪ *Knowledge scoring system:*

The total score of women knowledge was 28 marks. Each correct answer was given two marks and the incorrect answer was given one. The total scores were graded as Poor <50%, average 50 < 70 %, Good 70-100%).

Overall test-retest reliability coefficients were cronbach's alpha values of 0.86.

II. Non-invasive Prenatal Screening Likert scale: It is used to assess pregnant women's' attitudes related to non-invasive prenatal screening. It was adapted from (*Yotsumoto et al, 2012 & Kellogg et al, 2014*). It was used twice (pre and post counseling). It consists of 8 items. The response to the items ranged from 3= Agree

which considered positive attitude, 2=uncertain (neither agree nor disagree), 1= Disagree which considered negative attitude. The scores were summed up and converted into total percent score means and standard deviations were calculated. A higher score meant more positive attitude.

The total score level of attitude was classified into: Positive attitude: $\geq 17 - 24$ degree, Uncertain attitude: 8 - 16 degree, and Negative attitude :< 8 degree.

III. Pregnancy-Related Anxiety Questionnaire- Revised (PRAQ-R2) adapted from *Huizink et al, (2016)*. This questionnaire consisted of 10 items that cover three factors as follows: fear of giving birth, fear of bearing a handicapped child and concern about one's appearance. Each item is rated on a 5-point Likert scale. Researchers select two items only that cover fear of bearing a handicapped child. Pregnant woman who has higher score has higher level of child related anxiety. Scale reliability with cronbach's alpha was 0.90.

IV. Pregnant women satisfaction with counseling process it was adapted from *Martin et al, (2015)* based on QUOTE prenatal questionnaire. It consists of thirty nine items that eligible to the study objectives, and divided into three parts (part 1: consisted with thirteen items related to health education, part 2: consisted with twelve items related to decision making support, and part 3: consisted with fourteen items related to client counselor relation). The response to the items in each part ranged from 3= sufficient, 2= uncertain, and 1= insufficient. This tool used post counselling only. Overall test-retest reliability coefficients were cronbach's alpha values of 0.88.

Validity and Reliability of the Tools: Tools were reviewed by a panel of 5 experts in obstetric and gynecological nursing test the face and content validity. Each of experts was asked to examine tools for content coverage, clarity, wording, length, format and overall appearance. Modifications were done according to the comments "rephrasing and cancelling for four questions". Reliability: alpha cronbach test was used to measure the internal consistency of the tools used in the current study.

A supportive material non-invasive prenatal screening tests Arabic booklet was designed and developed by researchers in simple Arabic language in the light of related literature (*Allyse et al, 2015*) then reviewed by a jury of obstetric and gynecological nursing. This booklet include (different types of non-invasive prenatal screening tests, its indications, time of tests, purpose of tests,) that help pregnant woman and husband to gain more knowledge and guide their decision regarding use or decline of tests.

Pilot Study:

It was conducted on 10% of the study sample eighteen (32) pregnant women, were selected randomly based on sample criteria and excluded from the main study sample. Its aim was to evaluate the simplicity and clarity of the tools. It also helped in the estimation of the time needed to fill in the forms. According to the results of the pilot study, simple modifications were done as rephrasing questions or cancelling some questions.

Ethical Considerations:

The approval was obtained from Scientific Research Ethical committee in Faculty of Nursing at Ain Shams University before starting the study. Then an official permission was granted from the director of the Ain Shams University Hospital.

The researchers introduced themselves to the women who met the inclusion criteria and informed them about the purpose of this study in order to obtain their acceptance to share in this study. The researchers ensured that, the study posed no risk or hazards on their health and their fetus. In addition, their participation in the study is voluntary. Women who were willing to participate in the study and met the inclusion criteria were approached by the researchers and asked for verbal consent to confirm their acceptance, and all events that occurred during data collection were considered confidential.

Field work:

Researchers collected data three days per week from 9 am to 2 pm. data collection started at the beginning of July 2016 to the end of December 2016 for control group and from the beginning of January 2017 to the end of June 2017 for intervention group. After women had been fully informed about the research and consented for participation in the research. Data collection procedure has been done through three phases; assessment, implementation and evaluation phase.

Assessment phase: done at antenatal clinic and inpatient units for high risk pregnancy where researchers met each participant individually and fill tools of data collection at first meeting. Tools of data collection require 25-30 minutes to fill by each participant.

Implementation phase:

a. Control group:

Women in the control group received only routine antenatal care without counseling regarding non-invasive prenatal screening tests. The data collected during the study comprised demographic data, pregnant women's knowledge and attitudes regarding non-invasive prenatal screening tests.

b. Intervention group:

Counseling sessions:

It focus on giving simple information related to non-invasive prenatal screening tests, providing decision making support for pregnant women, and building trustful relationship. Researchers conduct two counseling session for each participant (first session concerned with non-invasive prenatal screening test that conduct on first trimester, and second session focus on non-invasive prenatal screening test that conduct on second trimester). Each counseling session carried out through two phases as follow;

Phase I

- Researchers conducted counseling session in privet room either in antenatal clinic or in inpatient units for high risk pregnancy to maintain pregnant women confidentiality.
- Researchers start with "**G**reeting" through introducing their self for pregnant woman and woman introduce her-self for researchers. This step aim to attain woman respect and trust.
- Researchers apply "**A**sk" with pregnant woman. On this step researchers ask pregnant woman questions effectively in a friendly manner using words that woman understands and listen carefully, without being non-judgmental. Identify woman needs by asking relevant questions about personal, social, family, medical and pregnant woman health including woman health on current and previous pregnancy, fetal health, non-invasive prenatal screening goals and past/ current use of non-invasive prenatal screening tests. This step aim to explore woman's knowledge and experience with non-invasive prenatal screening tests. In addition to clarify woman feeling and attitude toward non-invasive prenatal screening tests.
- Researchers utilize "**T**ell" through providing pregnant woman with relevant information that enable woman to achieve an informed decision regarding non-invasive prenatal screening tests. This step aim to increase woman awareness with non-invasive prenatal screening tests.
- After this step researchers give supportive material Arabic booklet to woman to help woman and her husband chance to gain the required knowledge. Also researchers inform pregnant woman that her husband can join with her on next time if he wanting that within one week after end of this time.
- This phase take about 30-40 minute with each pregnant woman.

Phase II

- Researchers utilize "**H**elp" through helping woman to make a decision and give other related information e.g. ethical and legal aspect related to use of non-invasive prenatal screening tests.
- Researchers apply "**E**xplain" through explain the selected non-invasive prenatal screening test in detail including information about suitable time for test, technique, accuracy, potential impact of test result on woman pregnancy and her family.
- Researchers utilize "**R**eturn" through women return for using non-invasive prenatal screening tests is advised and need for follow-up after test result.
- This phase take about 30-40 minute with each pregnant woman.

Evaluation phase:

Both groups (control and intervention) were interviewed after the intervention immediately and 4 weeks later for filling non-invasive prenatal screening structured Arabic interview questionnaire sheet part (3), and non-invasive prenatal screening Likert scale. While pregnant women satisfaction with counseling was fill by intervention group only.

Statistical analysis:

The data were analyzed using SPSS version 18.0. The t and χ^2 tests were employed to compare quantitative and qualitative demographic variables between the groups, respectively. The ANOVA test was used for within-group comparisons and between groups' comparisons of knowledge, and attitudes.

III. RESULTS

Table (1): Distribution of the studied pregnant women according to their socio-demographic characteristics

Items	Control Group (n= 165)		Intervention Group (n= 170)		X ²	P Value
	No	%	No	%		
Age						
35-	52	31.5	54	31.8	1.08	0.078
37-	70	42.4	71	41.8		
39-	26	15.8	27	15.9		
≥ 41	17	10.3	18	10.5		
Educational level						
Primary education	85	51.5	88	51.8	1.83	0.098
Secondary education	45	27.3	47	27.6		
University education	35	21.2	35	20.6		
Residence						
Urban	122	73.9	126	74.1	2.03	0.072
Rural	43	26.1	43	25.3		
Occupation						
Housewife	102	61.8	105	61.8	1.53	0.085
working	63	38.2	65	38.2		

Table (1): shows that 42.4% of pregnant woman on control group their age range between 37 - 38 years compared to 41.8% of pregnant woman on intervention group. Regarding educational level 51.5% of pregnant woman on control group had primary education as compared with 51.8% of pregnant woman on intervention group. As regard place of residence 73.9% of pregnant woman on control group from urban area versus 74.1% of pregnant woman on intervention group. Concerning occupation 61.8% of pregnant woman on control and intervention group were housewife.

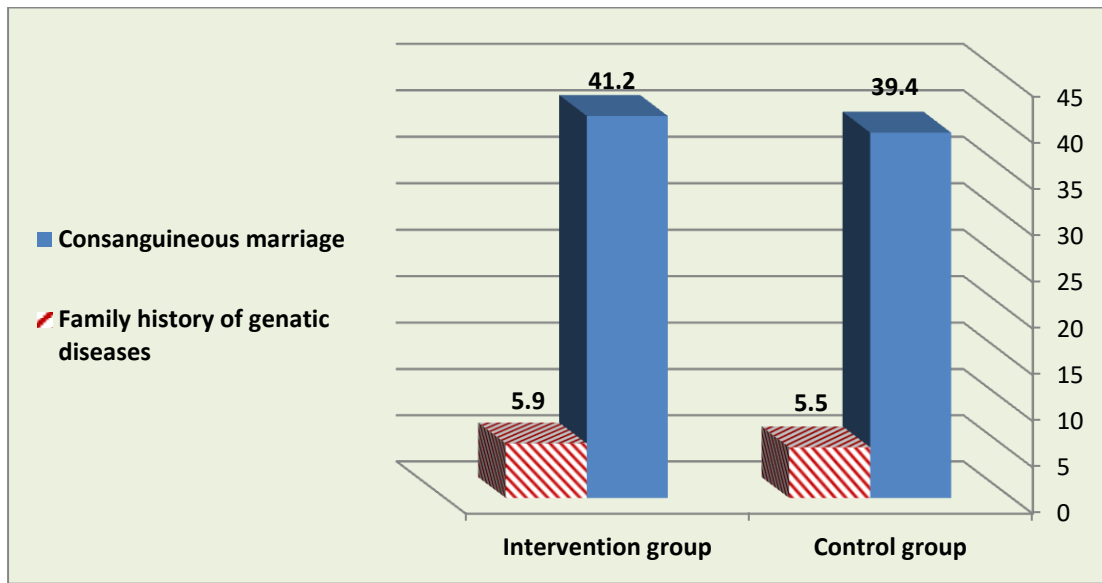


Figure (1): Distribution of the studied pregnant women according to their type of marriage and family history of genetic diseases

Table (2): Distribution of the studied pregnant women according to their current and previous obstetric history

Items	Control Group (n= 165)		Intervention Group (n= 170)		X ²	P Value
	No	%	No	%		
Gravida						
Primi-gravida	52	31.5	54	31.8	1.08	0.078
Multi- gravida	113	68.5	116	68.2		
Abortion						
Yes	85	51.5	88	51.8	1.83	0.098
No	80	48.5	82	48.2		
Child with congenital anomaly						
Yes	8	4.8	7	4.1	2.03	0.072
No	142	95.2	163	95.9		
Gestational age of current pregnancy						
≤ 12 week	102	61.2	105	61.8	1.53	0.085
13- ≥24 week	63	38.2	65	38.2		
Health problem during current pregnancy						
Yes	66	40.0	70	41.2	1.72	0.088
No	99	60.0	100	58.5		
Type of health problem						
Diabetes mellitus	28	42.4	29	41.4	1.65	0.073
Hypertension	22	33.3	23	32.9		
Asthma	16	24.3	18	25.7		

Table (2): reveals that 31.5% of pregnant woman on control group were primi-gravida compared to 31.8% of pregnant woman on intervention group. Concerning women had child with congenital anomaly 4.8% of pregnant woman on control group had child with congenital anomaly versus 4.1% of pregnant woman on intervention group. As regard, gestational age of current pregnancy 61.2% of pregnant woman on control group were on first trimester of pregnancy compared to 61.8% of pregnant woman on intervention group. Concerning health problem on current pregnancy 40.0% of pregnant woman on control group had problem versus 41.2% of pregnant woman on intervention group. Concerning type of health problem 42.4%, 33.3%, and 24.3% of pregnant woman on control group had diabetes mellitus, hypertension, and asthma respectively versus 41.4%, 32.9%, and 25.7% of pregnant woman on intervention group.

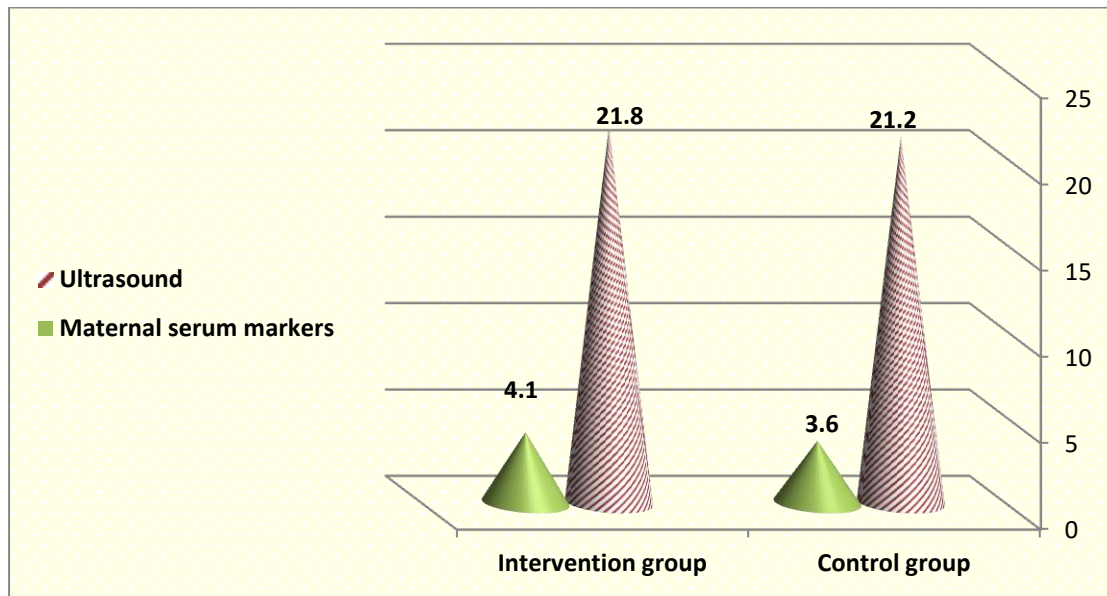


Figure (2): Distribution of the studied pregnant women according to their previous use of prenatal screening tests in both groups

Table (3): Distribution of the studied pregnant women according to factors affecting their decision to undergo non-invasive prenatal screening tests

Items	Control Group (n=165)		Intervention Group (n=170)		X ²	P Value
	No	%	No	%		
Factors leading woman to decline tests *						
▪ Fear of harming the baby	65	39.4	72	42.4	1.937	0.682
▪ Stress and anxiety from test	120	72.7	128	75.3	1.5	0.673
▪ Believe there was no action to be taken in case of bad result	140	84.8	146	85.9	1.388	0.586
▪ Believe there was no need for test	100	60.6	110	64.7	1.851	0.708
▪ Guilt feeling in case of bad result	82	49.7	98	57.6	0.38	0.538
▪ Worry about life change if has fetal with health problem	106	64.2	120	70.6	0.246	0.26
▪ Lack of information	145	87.9	152	89.4	0.62	0.806
Factors leading woman to accept tests	(n=56)		(n=68)		Fisher test	
▪ Worry about fetus health	20	12.1	28	16.5	1.608	0.673
▪ Have family experience of fetal health problem	16	9.7	18	10.6	1.704	0.646
▪ Doctor advice	12	7.3	15	8.8	1.633	0.593
▪ Have baby with congenital anomaly	8	4.8	7	4.8	2.407	0.499

* Woman chose more than one answer

Table (3): indicates that factors leading woman to decline decision regarding non-invasive prenatal screening tests among pregnant women in control group are lack of information, believe there was no action to be taken in case of bad result, stress and anxiety from test, and worry about life change if has fetal with health problem that represent 87.9%, 84.8%, 72.7%, and 64.2% respectively compared to 87.4%, 85.9%, 75.3%, and 70.6% respectively among pregnant women in intervention group. While, factors leading woman to accept tests are worry about fetus health, have family experience of fetal health problem, and doctor advice that represent 12.1%, 9.7%, and 7.3% respectively versus 16.5%, 10.6%, and 8.8% among pregnant women in intervention group.

Table (4): Comparison between pregnant women in control and intervention group regarding their knowledge about non-invasive prenatal screening tests

Total Knowledge Score	Control group			Intervention group		
	Before intervention	Immediately after	Follow up After 4 weeks	Before intervention	Immediately after	Follow up After 4 weeks
	%	%	%	%	%	%
Poor	84.8	83.6	80.0	82.9	15.3	4.7
Average	15.2	16.4	20.0	17.1	20.0	12.9
Good	0.0	0.0	0.0	0.0	64.7	82.4
Test of significant P value	#X ² = 1.925 P= 0.73 \$ X ² = 12.388 P= 0.001** @ X ² = 14.62 P= 0.001**			® X ² = 10.35 P= 0.001** ¥ X ² = 15.86 P= 0.001** ⊖ X ² = 8.65 P= 0.001**		

Control group versus intervention group before intervention

\$ Control group versus intervention group immediately after intervention

@ Control group versus intervention group 4 weeks after intervention

® Before intervention versus immediately after intervention for intervention group

¥ Before intervention versus 4 weeks after intervention for intervention group

⊖ Immediately after intervention versus 4 weeks after intervention for intervention group

Table (4): shows that there was no statistical significant difference between control and intervention group regarding their knowledge before intervention. While, there was highly statistical significant difference between control and intervention group regarding their knowledge immediately after intervention and at follow up after 4 week. In addition, there was a highly statistical significant improvement on intervention group knowledge immediately after intervention and at follow up after 4 week.

Table (5): Comparison between pregnant women in control and intervention group regarding their attitude about non-invasive prenatal screening tests

Total Attitude Score	Control group			Intervention group		
	Before intervention	Immediately after	Follow up After 4 weeks	Before intervention	Immediately after	Follow up After 4 weeks
	%	%	%	%	%	%
Negative	89.7	88.5	88.5	88.2	21.8	12.9
Uncertain	10.3	11.5	11.5	11.8	38.2	18.9
Positive	0.0	0.0	0.0	0.0	40.0	68.2
Test of significant P value	#X ² = 0.822 P= 0.931 \$ X ² = 11.608 P= 0.001** @ X ² = 13.55 P= 0.001**			® X ² = 11.46 P= 0.001** ¥ X ² = 14.09 P= 0.001** ⊖ X ² = 10.13 P= 0.001**		

Control group versus intervention group before intervention

\$ Control group versus intervention group immediately after intervention

@ Control group versus intervention group 4 weeks after intervention

® Before intervention versus immediately after intervention for intervention group

¥ Before intervention versus 4 weeks after intervention for intervention group

⊖ Immediately after intervention versus 4 weeks after intervention for intervention group

Table (5): reveals that there was no statistical significant difference between control and intervention group regarding their attitude before intervention. While, there was highly statistical significant difference between control and intervention group regarding their attitude immediately after intervention and at follow up after 4 week. In addition, there was a highly statistical significant improvement on intervention group positive attitude immediately after intervention and at follow up after 4 week.

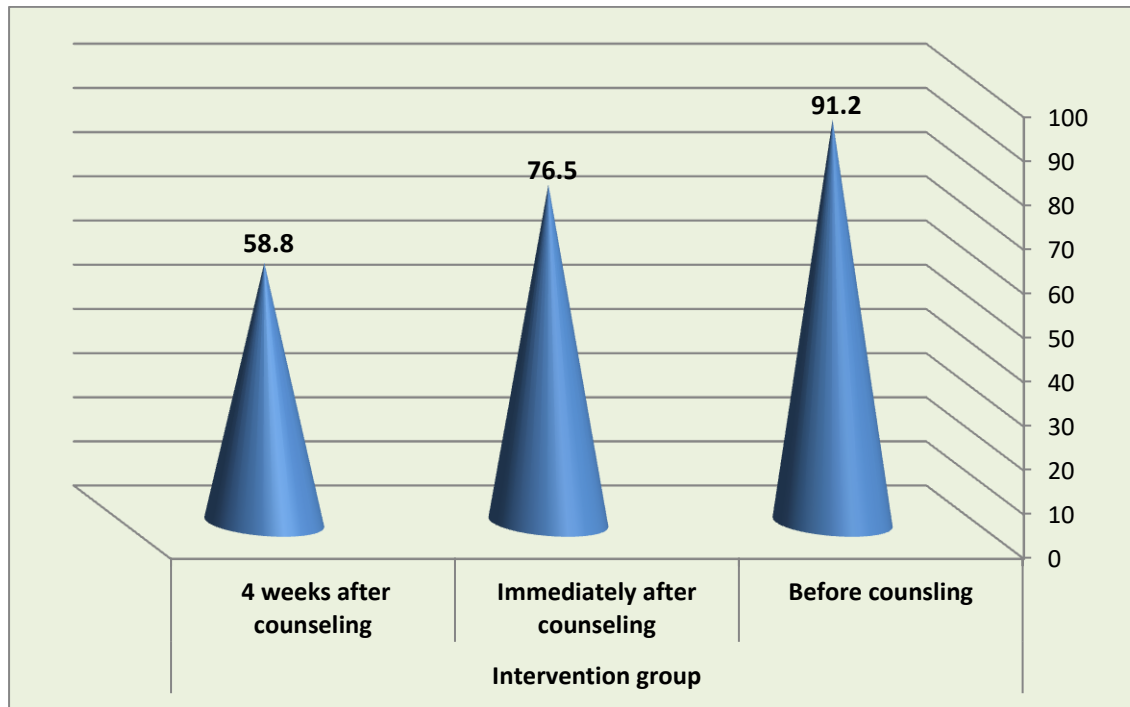


Figure (3): Distribution of the pregnant women on intervention group according to pregnancy related anxiety questionnaire revised 2 (PRAQ-R2).

PRAQ-R2 *X² = 6.83 P= 0.03* ¥ X² = 6.42 P= 0.04*

*Before intervention versus immediately after intervention for intervention group

¥ Before intervention versus 4 weeks after intervention for intervention group

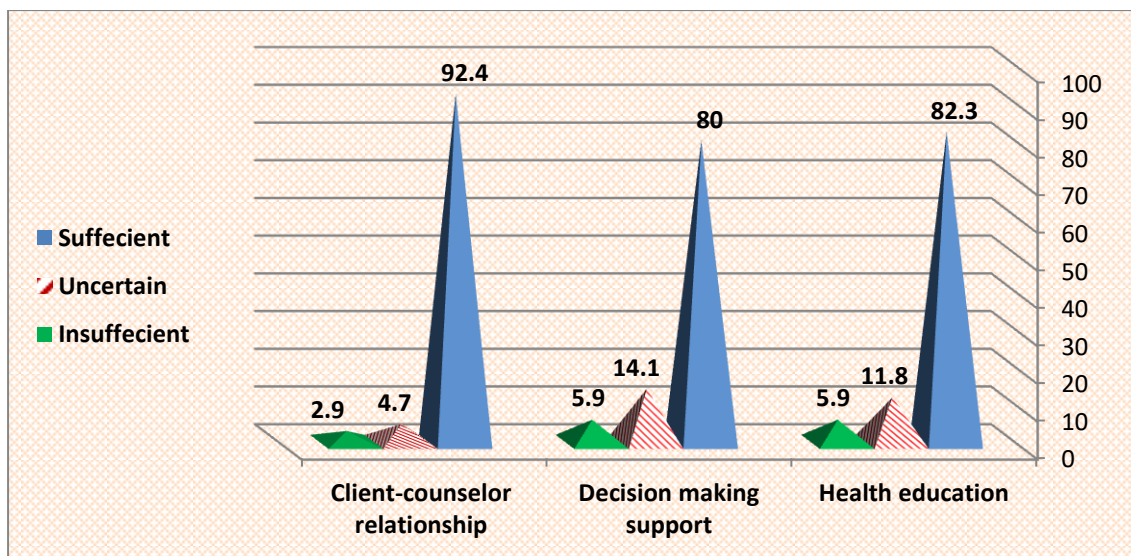


Figure (4): Distribution of the pregnant women on intervention group according to their satisfaction with counseling process

IV. DISCUSSION

The expectations of the pregnant woman and her partner attending for prenatal diagnosis are focused on reducing their uncertainty concerning their pregnancy. Most pregnant women who seek prenatal diagnosis want to have their expectation of a normal child confirmed and any uncertainty about the unborn child being unhealthy removed. In psychological terms, non-invasive prenatal screening is an anxiety inducing procedure therefore, counseling regarding non-invasive prenatal screening tests play crucial role in pregnant women's decision-making through promoting their knowledge, attitude, and anxiety. In addition to, reducing psychological distress and restoring feelings of personal control (*Ingrid, 2017*). So, this study was conducted to evaluate the effect of counseling regarding non-invasive prenatal screening tests on pregnant woman's knowledge, attitude, and anxiety.

The current study displayed that pregnant women's age on both groups ranged between 35-41 years with mean age for control and intervention group 37.21 ± 0.03 and 37.03 ± 0.12 respectively. Regarding educational level nearly one quarter of pregnant woman on both groups had university education. As regard place of residence nearly three quarter of pregnant woman both groups from urban area. Concerning occupation more than one third of pregnant woman on both groups were working. The findings showed homogeneous of studied sample and there is no statistical significant difference between both groups regarding their socio demographic characteristics.

Regarding, previous use of prenatal screening tests less than half of the studied pregnant women in both groups used ultrasound this finding was in the same line with *Sahlin et al; (2016)* who carried out a cross sectional study to assess women's awareness, attitude, preference for risk information and decision making regarding prenatal examination especially NIPT, before its introduction into Swedish health care. Its study revealed that 78.4% of women use ultrasound. This similarity was related to pregnant women were more familiar with ultrasound. Moreover, more than three quarter of pregnant women on both groups had poor knowledge regarding noninvasive prenatal screening tests before intervention.

Concerning factors that affecting pregnant women to undergoing non-invasive prenatal screening tests. The result of the current study displayed that factors leading woman to accept non-invasive prenatal screening tests were worry about fetus health, have family experience of fetal health problem, and doctor advice respectively. This study finding was in agreement with *Memnun et al, 2016* who conduct study to determine the rate of use of prenatal screening tests and the factors affecting the decision to have a prenatal screening test in pregnant women in Turkey and found that consanguineous marriage, history of spontaneous abortion, child with genetic disorder, multiparity or longer marriage duration were positively correlated with accepting a prenatal screening test. This could be justified by more than one third on both groups in our study has consanguineous marriage, less than one tenth on both groups has family history of genetic diseases, more than two third of pregnant women in booth groups were multigravida, nearly one half of pregnant women in booth groups had abortion and minority had child with congenital anomalies.

The current study finding was supported by *Sahlin et al; (2016)* who found that the main factors influencing women's decision to undergo prenatal chromosomal screening was worry about the baby's health 82.5%, followed by the desire to have much information about the fetus 54.5%, and less of women 14.1% were affected by the midwife or doctor at maternity clinic. This could be explained by in developed countries women were more empowered to make decision concerning their reproductive health than women in developing country.

Concerning factors that leading pregnant women to decline decision regarding non-invasive prenatal screening tests the result of the present study implied that lack of information, believe there was no action to be taken in case of bad result, stress and anxiety from test, and worry about life change if has fetal with health problem respectively among pregnant women in intervention group. This study finding was supported by *Gütsels-vander Walv et al; (2014b)* who stated that Islamic faith played a role in decision-making on having non-invasive prenatal screening tests in the study conducted in Muslim Turkish origin immigrants living in the Netherlands.

Regarding knowledge about non-invasive prenatal screening tests the result of the current study displays that there was no statistical significant difference between control and intervention group regarding their knowledge before intervention. Meanwhile, there was a highly statistical significant improvement on intervention group knowledge immediately after intervention and at follow up after 4 week. This finding was in accordance with *Youssef, El-Weshahi, and Ashry; (2017)*

who conducted a cross section study to investigate the Egyptian women's attitudes toward the prenatal screening (PNS) for congenital malformations and termination of pregnancy if medically indicated and assessing their knowledge and beliefs regarding prenatal screening. Its study indicated that more than half of studied women (52.71%) are lacking knowledge about the availability of the accurate tests for prenatal screening of congenital malformations. This could be explained by pregnant women perceived susceptibility to fetus with congenital abnormalities because of their advanced age especially primigravida. In addition, nearly one half of the studied pregnant women in both group had health problem on current pregnancy consider a major factor to motive them gain more knowledge about non-invasive prenatal screening tests and have positive attitude towards them.

In relation to attitude regarding non-invasive prenatal screening tests the result of the present study pointed out that there was no statistical significant difference between control and intervention group regarding their attitude before intervention. While, there was highly statistical significance increase in pregnant women's positive attitude regarding non-invasive prenatal screening tests immediately after counseling and 4 weeks after intervention. This finding was supported by *Youssef, El-Weshahi, and Ashry; (2017)* who reported that after giving information about PNS, more than three quarters (77.5%) of the studied women held positive attitudes toward the prenatal screening for congenital malformation. This because of increasing women's social level that indicated by educational level, living in urban areas and working may be accompanying with increasing the level of knowledge of risks in pregnancy, decreasing fear from medical interventions, and rising the acceptance of preventive measures. In addition to, improve the way of thinking and decision making.

Concerning STAI and PRAQ-R2 the result of the current study displayed that there was significant reduction on pregnant women's level of anxiety after counseling as proved by decrease level of STAI and PRAQ-R2 after counseling and at follow up after 4 weeks. This finding was on contrary with *Bjorklund, Marsk, and Ohman, (2013)* who carried out a randomized control study to explore if an information film about prenatal examinations affects pregnant women's worry and anxiety and reported that there were no statistically significant differences between the groups neither in state nor trait anxiety. Regarding worry about the possibility of something being wrong with the baby and worry about giving birth, there were no statistically significant differences between the groups. The women stated that to see the film increased their worry rather than decreased it.

Regarding pregnant women satisfaction with counseling process the result of the present study pointed out that majority of pregnant women on intervention group were satisfied with client-counselor relationship. While, more than three quarter of them were satisfied with health education and decision making support. The previous study finding was in accordance with *Mikamoa, and Nakatsuka; (2015)* who found that 60% of pregnant women prefer to receive advice regarding non-invasive prenatal screening test from familiar health care staff at hospital they were attending for antenatal care. As provide pregnant women with stuffiest knowledge reduce anxiety and enhance pregnant women doctors and midwife relationship.

In addition, the previous study finding was in the same line with *Martin, et al; (2013)* who conducted across section study to assess parental preferences regarding prenatal counseling for congenital anomaly tests and parental perceptions of midwives' performance. They found that all clients perceive the client-midwife relation as very important, most clients see health education as important and one third of the clients value health education for decision-making support.

Finally, giving birth to a child complaining from congenital abnormalities is associated with a marked psychological and social influence on all the family members especially in developing countries. Therefore, there is a significant need for increasing the awareness of Egyptian women in the reproductive age about the availability of different non-invasive prenatal screening tests for congenital malformation, the accuracy and safety of these tests, and parents gain from early detection of congenital malformations in their offspring.

V. CONCLUSION

The findings of the current study supported the hypothesis of this study which stated that pregnant women who had counseling have significant improvement on their knowledge and their positive attitude regarding non-invasive prenatal screening tests in addition to lower their level of anxiety than pregnant women who received routine care.

VI. RECOMMENDATIONS

In the light of the previous results of the present study the following recommendations are suggested; application of counseling process to all pregnant woman as a part of antenatal care to improve their knowledge and attitude regarding non-invasive prenatal screening tests and lower their level of anxiety. Further research is needed to evaluate effect of counseling regarding non-invasive prenatal screening tests result on pregnant women emotional well-being after receiving positive test result.

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