Effect Of Educational Nutritional Program For Pregnant Women On Fetal Out Come At Birth.

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ABSTRACT

Objectives: The aim of this study is to evaluate the impact of a designed educational nutrition program for primipara on neonatal weight.

Subject and Methods: The study was carried out at El-Tadamon hospital in Port-Said City This is a private hospital providing outpatient and inpatient obstetric and gynecological services in using a quasi-experimental (pre & post test) design The subjects of the study were any primiparous pregnant woman attending the mentioned study setting during the time of the study was eligible for inclusion in the study sample if she fulfills the following eligibility criteria.

Results: The results revealed that there was a significant improvement in the woman knowledge score about nutrition during pregnancy before and after program .

Conclusion: Educational program has a significant and improvement impact on knowledge regarding nutrition during pregnancy, and this is negatively reflected on their dietary practices and habits

Key words: Effect of Educational Nutritional program for Pregnancy and birth outcome.

INTRODUCTION

Pregnancy is one of the most important periods in the life of a woman, a family and a society. Extraordinary attention is therefore given to antenatal care by the health care systems of most countries. The goal of antenatal care is to prevent health problems in both infant and mother and to see that each newborn child has a good start.

The care provided needs to be appropriate and not excessive. New technologies need to be implemented continually, while older services need to be reconsidered. The care for each pregnant woman needs to be individualized based on her own needs and wish *(Gabbe et al., 2007)*.

A pregnant woman should be helped to understand the importance of good nutrition for herself and for her fetus, she may be more motivated than at other times in her life to improve her dietary habits. She should also be encouraged to continue her new interest in nutrition after the baby arrives *(Macintosh and Mack, 2000)*

Antenatal care is a systematic and comprehensive physical, social and psychological care of the pregnant woman to maintain, protect and promote the health for mothers and her fetus, and to help a woman approach pregnancy and birth as positive experiences. To a large extent antenatal care can contribute greatly to this purpose. Many studies have shown the importance of the antenatal care and its effect on reducing the incidence of maternal and infant morbidity, mortality and improving pregnancy outcome *(Taylor et al., 2001)*.

Maternal malnutrition prior to and during pregnancy manifested by low bodyweight, short stature, Inadequate energy intake during pregnancy and coexisting micronutrient deficiency are considered major determinants in developing countries where the burden is too high. Low Birth Weight (LBW) is a multi-factorial outcome and its

prevention requires a lifecycle approach and interventions must be continued for several generations. So, most interventions are now targeted during pregnancy primarily due to the increased nutritional demand and aggravations of already existing inadequacy in most women *(Alam, 2009)*.

Dietary counseling should be an ongoing aspect of prenatal care;

it is not enough to talk about it at the first visit. It includes information on weight, dietary assessment, and dietary planning to prevent complications and problems for the pregnant women and their babies during pregnancy, labor, and post partum period *(Gabbe et al., 2007)*.

AIM OF STUDY:

The aim of this study is to evaluate the impact of a designed educational nutrition program for primipara on neonatal weight.

SUBJECT AND METHODS:

This study was carried out using a controlled quasi-experimental research design with pre-post assessment. The study was carried out at El-Tadamon hospital in Port-Said city. This is a private hospital providing outpatient and inpatient obstetrical and gynecological services. the process of data collection and implementation of the

educational program consumed 15 months from April 2011 to September 2012 The data were collected according to One tool was developed and used by the researcher for data collection.

Ethical Considerations

An informed consent form was signed by each participant before collecting any data. The form explained the study aim in a simple and clear manner to be understood by common people. No harmful maneuvers were performed or used, and no foreseen hazards were anticipated from conducting the study. Participants were informed about their right to withdraw from the study at any time without giving any reason. Data were considered confidential and not be used outside this study without approval..

Content Validity:

The researcher designed an opinnionnaire sheet to test the content validity of the assessment questionnaire   sheet for nurses and mothers by a jury including 10 Experts in the field of obstetric and gynecology from medical and nursing faculty staff. It involved two parts:

C- The opinions of the experts for each item were recorded on a two point scale: relevant, not relevant and clear, not clear.

D- General or overall opinion about the form, they were requested to express their opinions and comments on the tool and provide any suggestions for any additional or omissions of items. Then necessary modifications were done. This phase was carried out in a period of two months.

   A pilot study, which was carried out on 10 % from pregnant woman .The main purpose of the pilot study were to test the clarity, feasibility of the tools and whether it was understandable, and to determine the time needed to fill the tool. The tool was handed to participants to fill it and collected by researcher. The time for the completion of the questionnaire sheet was ranged from 30 to 60 minutes. Then reliability of the tool was done which lead to omission. Following this pilot study, the process of data collection and implementation of educational program consumed 15 months from April 2011 to September 2012.

RESULTS

   Table (1) shows that women in study and control groups had a close mean age (27.7 and 28.0 years respectively). The highest percentages had intermediate education (46.4% and 58.9%, respectively). More than 80% of them were housewives, with crowding index less than two persons per room.

   As regards their husbands, the table demonstrates a higher mean age in the study group was (29.9 years) compared to the control group (31.5 years) and this was the only difference of statistical significance between the two groups (p=0.02). More than two-thirds of the husbands were employees and more than half of them had intermediate education.

   Figure1 indicates a higher prevalence of consanguinity among women in the control group (43.8%), compared to the study group (35.7%). However, the difference was not statistically

ignificant (p=0.22).

Concerning women's dietary intake before the intervention, Table 2 indicates that the women in the control group had statistically significantly higher daily intake of vegetables and fruits (p=0.01), dairies (p=0.048), and fats (p<0.001). Meanwhile, women in the study group had higher intake of proteins (p=0.004). However, the dietary intake according to Recommended Daily Allowances (RDA) was very low in both groups for the main food groups. Thus, only six (5.4%) women in the study group had balanced diet, compared to only one (0.9%) in the control group, but the difference was not statistically significant (p=0.12).

Tale 3 demonstrates statistically significant improvements in the post-intervention dietary knowledge of women in the study group in all tested elements (p<0.001). In total, 27.7% of the women had satisfactory knowledge at pre the intervention phase, and this increased to 95.5% at the posttest (p<0.001). No statistically significant differences could be revealed in control group women's knowledge between pre and post intervention tests. In total, 17.9% of the women had satisfactory knowledge at pre the intervention phase, and this slightly increased to 18.8% at the posttest with no statistical significance (p=0.86).

Concerning the newborn outcomes Table 4 points to statistically significant differences in the respiratory rate (p=0.007), and heart rate (p<0.001). As noticed from the table, more newborns in the study group had abnormal respiratory rate, but more newborns in the control group had abnormal heart rates. The mean body temperature in the two groups was similar.

Table 5 compares the newborn anthropometric measurements in the study and control groups. It indicates statistically significant differences in the body weight and head circumference (P<0.001). It is clear that the newborns in the study group had higher mean body weight and head circumference. Meanwhile, the length and chest circumferences did not show statistically significant differences.

Comparison of the newborn physical assessment findings in the study and control groups (Table 6) demonstrated that newborns in the study group had statistically significantly more Moro reflex (p=0.001), and less scalp molding (p=0.005) and caput succedaneum (p<0.001). They had higher percentages of equal size of the eyes (p<0.001), less nasal obstruction (p<0.001) and asymmetric chest (p<0.001). On the other hand, newborns in the control group had statistically significantly more abnormal movement in the extremities (p<0.001), firm/distended abdomen (p<0.001), imperforate anus (p<0.001), and less equal breath sounds (p<0.001).

Table 7 shows that a statistically significantly higher percentage of newborns in the control group had their Apgar score <7 (p<0.001). They also had a higher rate of NICU admission (p<0.001).

Table 8 presents the relations between the intake of balanced diet after intervention among women in the study group and their personal characteristics. As the table indicates, no statistically significant associations could be revealed with any of the women's characteristics.

Table (1): Socio-demographic characteristics of women in the study and control groups

	Group				X^2 Test	p-value
	Study (n=112)		Control (n=112)			
	No.	%	No.	%		
Age (years):						
<25	30	26.8	23	20.5		
25-	45	40.2	50	44.6	1.24	0.54
30-35	37	33.0	39	34.8		
Range	19.0-35.0		19.0-35.0			
Mean±SD	27.7±4.2		28.0±4.2			
Education:						
Illiterate	4	3.6	3	2.7		
Read/write	6	5.4	3	2.7		
Basic	11	9.8	6	5.4	5.09	0.40
Intermediate	52	46.4	66	58.9		
University	26	23.2	20	17.9		
Higher	13	11.6	14	12.5		
Job:						
Housewife	22	19.6	17	15.2		
Working	90	80.4	95	84.8	0.78	0.38
Crowding index:						
<2	91	81.3	95	84.8		
2+	21	18.8	17	15.2	0.51	0.48
Husband age (years):						
<30	57	50.9	37	33.0		
30-	29	25.9	34	30.4	8.01	0.02*
35+	26	23.2	41	36.6		
Range	20.0-43.0		22.0-50.0			
Mean±SD	29.9±4.8		31.5±4.6			
Husband job:						
Employee	78	69.6	75	67.0		
Worker	34	30.4	37	33.0	0.19	0.67
Husband education:						
Illiterate	0	0.0	1	0.9		
Read/write	6	5.4	4	3.6		
Basic	11	9.8	8	7.1	2.31	0.81
Intermediate	61	54.5	60	53.6		
University	27	24.1	32	28.6		
Higher	7	6.3	7	6.3		

(*) Statistically significant at p<0.05

Figure (1): Comparison of consanguinity among women in the study and control groups
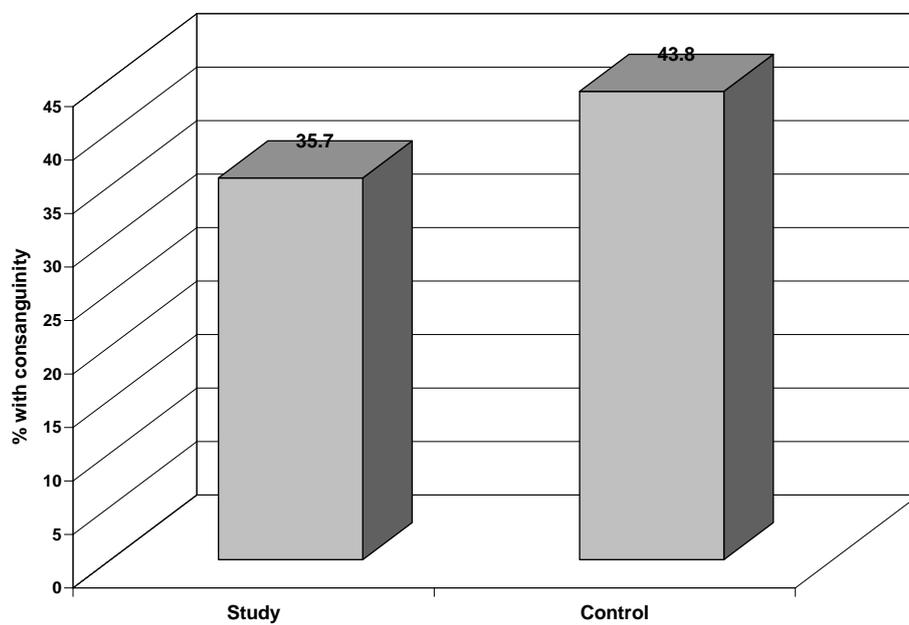
Table (2) Pre-intervention dietary intakes during pregnancy among women in the study and control groups

Daily intake of:	Group				Mann Whitney Test	p-value
	Study (n=112)		Control (n=112)			
	No.	%	No.	%		
Cereals:						
Range	1.0-4.0		1.0-4.0			
Mean±SD	2.1±0.8		2.2±0.6		2.26	0.13
Proteins:						
Range	0.0-3.0		0.0-2.0			
Mean±SD	1.3±0.5		1.1±0.6		8.10	0.004*
Legumes						
Range	0.0-0.2		0.0-1.0			
Mean±SD	0.2±0.5		0.3±0.4		1.39	0.24
Vegetables/fruits:						
Range	0.0-2.0		0.0-2.0			
Mean±SD	0.4±0.5		0.6±0.6		6.46	0.01*
Dairies:						
Range	0.0-3.0		0.0-3.0			
Mean±SD	1.1±0.7		1.2±0.7		3.90	0.048*
Fats:						
Range	0.0-1.0		0.0-1.0			
Mean±SD	0.2±0.4		0.5±0.5		16.78	<0.001*
Sugars:						
Range	0.0-4.0		0.0-2.0			
Mean±SD	0.7±0.8		0.6±0.6		0.03	0.86
Intake according to recommended daily allowances (RDA):						
Cereals	3	2.7	1	0.9	Fisher	0.62
Proteins	3	2.7	0	0.0	Fisher	0.25
Vegetables/fruits	1	0.9	0	0.0	Fisher	1.00
Dairies	0	0.0	0	0.0	0.00	1.00
Balanced diet	6	5.4	1	0.9	Fisher	0.12

(*) Statistically significant at p<0.05

Table (3): Pre-post-intervention dietary knowledge among women in the study and control groups

Satisfactory knowledge (50%+):	Time				X^2 Test	p-value
	Pre		Post			
	No.	%	No.	%		
Study:						
Balanced diet	68	60.7	110	98.2	48.26	<0.001*
Proteins	43	38.4	110	98.2	92.57	<0.001*
Iron	41	36.6	110	98.2	96.75	<0.001*
Vitamins	35	31.3	108	96.4	103.06	<0.001*
Other minerals	36	32.1	103	92.0	85.11	<0.001*
Fats	40	35.7	107	95.5	88.84	<0.001*
Fluids	46	41.1	108	96.4	79.88	<0.001*
Total knowledge:						
Satisfactory (50%+)	31	27.7	107	95.5		
Unsatisfactory (<50%)	81	72.3	5	4.5	109.02	<0.001*
Control:						
Balanced diet	81	72.3	84	75.0	0.21	0.65
Proteins	63	56.3	63	56.3	0.00	1.00
Iron	49	43.8	54	48.2	0.45	0.50
Vitamins	21	18.8	21	18.8	0.00	1.00
Other minerals	11	9.8	11	9.8	0.00	1.00
Fats	20	17.9	23	20.5	0.26	0.61
Fluids	38	33.9	41	36.6	0.18	0.67
Total knowledge:						
Satisfactory (50%+)	20	17.9	21	18.8		
Unsatisfactory (<50%)	92	82.1	91	81.3	0.03	0.86

(*) Statistically significant at p<0.05

Table (4): Newborn vital signs in the study and control groups at birth

	Group				X^2 Test	p-value
	Study (n=112)		Control (n=112)			
	No.	%	No.	%		
Respiratory rate:						
Normal	95	84.8	107	95.5		
Abnormal	17	15.2	5	4.5	7.26	0.007*
Range	20-55		40-60			
Mean±SD	46.9±5.5		47.0±4.3			
Heart rate (BPM):						
<120	2	1.8	0	0.0		
120-	105	93.8	51	45.5	68.21	<0.001*
160+	5	4.5	61	54.5		
Range	110-170		120-180			
Mean±SD	130.4±10.4		152.2±15.3			
Body temperature:						
<37	55	49.1	58	51.8		
37-	56	50.0	50	44.6	--	--
37.5+	1	0.9	4	3.6		
Range	36.0-38.0		36.0-39.0			
Mean±SD	36.5±0.5		36.5±0.6			

(*) Statistically significant at p<0.05   *(--) Test result not valid*

Table (5): Newborn anthropometric measurements in the study and control groups at birth

	Group				Mann Whitney Test	p-value
	Study (n=112)		Control (n=112)			
	No.	%	No.	%		
Body weight (gm):						
<2500	8	7.1	3	2.7		
2500-	8	7.1	33	29.5		
3000+	96	85.7	76	67.9		
Range	2200-4500		2250-4500			
Mean±SD	3571.4±562.2		3185.7±507.2		26.47	<0.001*
Length (cm):						
<50	68	60.7	73	65.2		
50+	44	39.3	39	34.8		
Range	42.0-51.0		38.0-55.0			
Mean±SD	48.6±1.5		48.3±2.0		3.06	0.08
Head circumference (cm):						
<35	94	83.9	94	83.9		
35+	18	16.1	18	16.1		
Range	31.0-35.0		30.0-46.0			
Mean±SD	33.6±1.2		33.3±1.9		11.88	<0.001*
Chest circumference (cm):						
<35	112	100.0	110	98.2		
35+	0	0.0	2	1.8	Fisher	0.50
Range	30.0-34.0		30.0-45.0			
Mean±SD	31.8±1.0		31.8±1.9			

(*) Statistically significant at p<0.05

Table (6): Newborn physical assessment findings in the study and control groups

	Group				X^2 Test	p-value
	Study (n=112)		Control (n=112)			
	No.	%	No.	%		
Reflexes:						
Suckling	57	50.9	67	59.8	1.81	0.18
Moro	78	69.6	53	47.3	11.49	0.001*
Grasp	12	10.7	5	4.5	3.12	0.08
Scalp molding	4	3.6	16	14.3	7.91	0.005*
Caput succedaneum	3	2.7	80	71.4	113.48	<0.001*
Eyes:						
Equal size	104	92.9	87	75.9		
Unequal size	8	7.1	27	24.1	12.22	<0.001*
Nasal obstruction	2	1.8	25	22.3	22.28	<0.001*
Asymmetric thorax:	22	19.6	60	53.6	27.78	<0.001*
Extremities movement:						
Normal	100	89.3	83	74.1		
Abnormal	3	2.7	22	19.7	8.63	0.003*
Abdomen:						
Soft	74	66.1	36	32.1		
Firm	36	32.1	49	43.8	36.67	<0.001*
Distended	2	1.8	27	24.1		
Umbilical cord:						
Moist	81	72.3	32	28.6		
Dry	31	27.7	78	69.6	--	--
Foul	0	0.0	2	1.8		
Genitalia:						
Normal male	51	45.5	58	51.8		
Normal female	59	52.7	46	41.1	--	--
Ambiguous	2	1.8	8	7.1		
Imperforate anus	6	5.4	48	42.9	43.04	<0.001*
Breath sounds:						
Equal	81	72.3	25	22.3		
Unequal	31	27.7	87	77.7	56.16	<0.001*

(*) Statistically significant at p<0.05   *(--) Test result not valid*

Table (7): Newborn Apgar scores and NICU admission in the study and control groups

	Group				X^2 Test	p-value
	Study (n=112)		Control (n=112)			
	No.	%	No.	%		
Apgar score:						
<7	31	27.7	82	73.2		
7+	81	2.3	30	26.8	46.45	<0.001*
Range	5-9		4-9			
Mean±SD	7.1±1.1		6.0±1.4			
Infant NICU admission:						
Yes	35	31.3	77	68.8		
No	77	68.8	35	31.3	31.50	<0.001*

(*) Statistically significant at p<0.05

Table (8): Relation between post-intervention intake of balanced diet among women in the study group and their personal characteristics

	Take balanced diet				X^2 Test	p-value
	No		Yes			
	No.	%	No.	%		
Age (years):						
<25	24	80.0	6	20.0		
25-	38	84.4	7	15.6	0.53	0.77
30-35	29	78.4	8	21.6		
Education:						
Illiterate/read	9	90.0	1	10.0		
Basic/intermediate	53	84.1	10	15.9	2.06	0.36
University	29	74.4	10	25.6		
Job:						
Housewife	19	86.4	3	13.6		
Working	72	80.0	18	20.0	Fisher	0.76
Crowding index:						
<2	74	81.3	17	18.7		
2+	17	81.0	4	19.0	Fisher	1.00
Husband age (years):						
<30	47	82.5	10	17.5		
30-	25	86.2	4	13.8	--	--
35+	19	73.1	7	26.9		
Husband job:						
Employee	62	79.5	16	20.5		
Worker	29	85.3	5	14.7	0.52	0.47
Husband education:						
Illiterate/read	6	100.0	0	0.0		
Basic/intermediate	59	81.9	13	18.1	1.92	0.38
University	26	76.5	8	23.5		
Income:						
Insufficient	63	84.0	12	16.0		
Sufficient	28	75.7	9	24.3	1.13	0.29
In charge to buy food:						
Woman herself	27	77.1	8	22.9		
Other person	64	83.1	13	16.9	0.56	0.45
In charge to prepare food:						
Woman herself	72	80.9	17	19.1		
Other person	19	82.6	4	17.4	Fisher	1.00
Total knowledge:						
xSatisfactory (50%+)	87	81.3	20	18.7		
Unsatisfactory (<50%)	4	80.0	1	20.0	Fisher	1.00

(--) Test result not valid

DISCUSSION

Pregnancy is a powerful and a complex time in a woman's life. She may be happily looking forward to the birth of a long-awaited first child. She may be wondering how to make adjustments for another of many children. She may be waiting fearfully through the period of pregnancy *(Simon et al., 2006; Towel, 2009)*.

Family income was consider to be relevant difference in socio-demographic characteristics that was of statistical significance between women in the two groups. It was found that more women in the control group had sufficient income compared with the study group. This would have an influence on the availability to quality food in adequate amounts *(Morland et al., 2002)*.

The present study showed increased trends of intake of balanced diet after intervention in the study group with women's educational level, working status, husband education, higher income, and being herself in charge of purchasing and preparing food. However, these trends lacked statistical significance because of the small numbers of women taking balanced diet, thus decreasing the statistical efficiency. Nevertheless, these trends are in agreement with previous studies that demonstrated the effect of socio-economic level *(Groth et al., 2001; Dynesen et al., 2003; Mishra et al., 2005)*, higher educational levels *(Freisling et al., 2006; Northstone et al., 2008)*

As regards newborn outcomes, the present study revealed some significant differences between the study and control groups. Thus, the newborns in the study group had significantly better Apgar scores and lower rate of NICU admission. These positive fetal outcomes may be attributed to the better maternal nutritional status in this group, which is reflected on newborn's wellbeing. In congruence with this, *Huh et al. (2005)* showed that the dietary protein composition during pregnancy affects offspring vital signs.

Moreover, the newborns of women in the study group had significantly better anthropometric measurements as body weight and head circumference. These findings add to the evidence that the nutritional education program had a positive impact on maternal nutritional status, with subsequent positive effect on their newborns. In congruence with this, *Yegammai et al (2002)* studied the effect of nutrition education of mothers on nutritional status of infants at Coimbatore, India. It was observed that the infants born to the mothers with nutrition education recorded significantly higher birth weights than the infants born to the mothers without nutrition education. Similarly, *Paul and Vijaylakshmi (2002)* studied the effect of improving the maternal nutritional status on the birth weight of the newborn. The results revealed that mean birth weight of the neonates born to the mothers in control group was lower than those of the intervention groups.

Furthermore, a systematic review demonstrated that food-support programs may have a favorable effect on mean birth weight in high-risk sub-groups such as heavy smokers and very young mothers. However, none of the studies measured the effectiveness of the programs on mean birth weight in later pregnancies *(D'Souza et al., 2006)*. Meanwhile, a study in India confirmed the positive relation between maternal nutritional status and birth weight of infants *(Mridula et al., 2001)*. Also, *Parvathi and Begum (2007)* found that significantly more pregnant women with anemia gave birth to infants with very low birth weight and low birth babies.

On the same line, ***Yegammai and Anuradha (2008)*** at Coimbatore, India observed that as maternal weight gain increased the weight of newborn was also increased. Also, ***Bang and Sunlee (2009)*** in Korea revealed a positive correlation between pregnant women's weight and their infants' birth weight. However, their study demonstrated that the maternal nutrient intake had greater influence on birth weight of infants than the maternal body weight. A similar relation between gestational weight gain and birth weight of infants was reported in a study in Belgium ***(Guelinckx et al., 2010)***.

In agreement with the present study finding regarding better head circumference values in the study group, ***Yegammai et al (2002)*** and ***Bhavana et al. (2004)*** demonstrated a positive association between maternal nutritional status and neonatal head circumference. This was also confirmed in a systematic review which concluded that it can be confidently said that programs can have a beneficial effect on newborn head circumference ***(D'Souza et al., 2006)***.

The current study has also demonstrated significantly better physical assessment findings in the study group newborns, compared to the control group. This was shown in vital signs as heart rate, better reflexes, less scalp molding and caput succedaneum which indicate prolonged labor, and less abnormal findings. While not all these findings may be attributed to maternal nutritional status, many of them do. These results are in agreement with previous studies which demonstrated that maternal diet during pregnancy may be related many aspects of newborn health such as the respiratory outcomes ***(Romieu et al., 2007; Chatzi and Kogevinas, 2009)***, neurodevelopment ***(Oken and Bellinger, 2008)***, and bone health ***(Yin et al., 2010)***.

CONCLUSION:

Based on study findings, it can be concluded that:

Educational program has a significant and improvement impact on the at pregnant women's knowledge and practice related to nutritional care based on scientific background.

RECOMMENDATIONS:

- The educational program which proved successful should be integrated in the ANC program at the study setting and in similar ones.

- Training programs are recommended for nurses in order to enhance their knowledge and skills regarding nutrition during pregnancy in order to be able to educate and counsel pregnant women.

- Simple illustrative booklets and pamphlets in Arabic language should be prepared and made available in antenatal care units addressing practical issues related to the nutritional needs during pregnancy.

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تأثير برنامج تعليمي غذائي للسيدات الحوامل للمرة الأولي علي الحمل والولادة

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الـخـلاصـــة

الدراسة الحالية دراسة شبة تجريبية هدف الدراسة هو تقييم تاثير برنامج تعليمى عن التغذية اثناء الحمل على نتائج الحمل لدى الامهات البكريات. وشملت عينة الدراسة على مجموعتين من 112امراة حامل بكرية فى الثلث الاول والثانى من الحمل بمستشفى التضامن فى الفتره من شهر ابريل 2011 الى سبتمبر 2012 ، وقد تم تجميع البيانات عن طريق استخدام استمارة استبيان اشتملت على بيانات عن الخصائص الاجتماعية والديموغرافية بالاضافة الى تقييم المعرفة والعادات الغذائية استمارة فحص، قائمة ملاحظة نتائج الام. صممت الباحثة برنامجا تعليميا يهدف إلى تحسين معرفة المرأة الحامل والممارسة المتعلقة بالرعاية التغذوية يعتمد على الخلفية العلمية ، وفي ضوء الاحتياجات المحددة من التقييم القبلي. وتم تطبيق البرنامج على أعضاء مجموعة الدراسة فقط . وقد تم تقييم المعرفة و الممارسات الغذائية للمرأة بعد الولادة في كل المجموعتين. بالإضافة إلى ذلك، تمت مقارنة نتائج الحمل. وقد اسفرت النتائج على ان كانت المعرفة الغذائية قبل التدخل منخفضة في المجموعتين، مع عدم وجود فروق ذات دلالة إحصائية بينهما بينما أظهرت النتائج الاختبار البعدي أن 95.5٪ من مجموعة الدراسة كن على معرفة مرضية مقارنة مع 18.8٪ في المجموعة الضابطة.

كشفت النتائج عن تحسنات ذات دلالة إحصائية بعد التدخل في المعرفة والعادات الغذائية في مجموعة الدراسة ولكن ليس في المجموعة الضابطة

الكلمات الإسترشادية :اهمية التغذية السليمة اثناء الحمل تاثير التغذية السليمة على نتائج الحمل.