

Gestational Diabetes in UNRWA health clinics in Gaza Strip: Impact of Educational Program.

¹Ahmad A. Elshair, ²Mona S. Shenouda, and ²Shadia A. El-Kader

¹UNRWA, Health Program, Nursing Department Gaza, ²Cairo University, Faculty of Nursing, Egypt
ahmadelshair1@yahoo.com

Abstract: Gestational Diabetes Mellitus (GDM) is still considered one of the most serious health problems worldwide affecting 1 to 14% of pregnant women, in Gaza Strip (GS) 5.5%. The aim of the study was to examine the impact of educational program in reducing the prevalence of GDM and its associated health problems among pregnant women in GS. Two hypotheses were addressed: 1) Pregnant women who will receive educational program have higher post-test knowledge & practices scores related to GDM than those who do not. 2) Prevalence of problems associated with GDM receiving the educational program will be lower than those among pregnant women than who do not. Quasi-experimental design was used, the sample consisted of 188 pregnant women, 87 subjects who attended the educational program & 101 controls who received the routine prenatal care. Data were collected through self-structured interviewing questionnaire for data related to previous and current pregnancy status, & the pretest-post test sheet to examine knowledge & practice related to the problem of GDM & maternal health records. The educational program consisted of 4 main sessions, given jointly with an educational booklet for subjects. Data were collected twice, at the booking visit & at the postnatal visit. The main results were: participants in the study group who adherence to healthy habits & decrease sugar intake were significantly higher in the post test compared with the pretest and those of the control group at $\alpha=0.05$. Mean age of participants was 34 years, 65.9% had basic education, family size were between 5-6 members, the vast majority were 89.1-92.1% were multiparous, with mean BMI more than 31, CS delivery slightly declined, insulin treatment increased, complications of the mothers declined & problems to the infants were declined, the mean weight of infants below 3500 gram. The study concluded that the education program had a positive impact on knowledge and practice regarding GDM. The study recommended that midwives & nurses who work at the MCH clinics should effectively utilize their roles as educators and counselors to contribute to the decrease of problems of GDM among pregnant women in Gaza Strip, & to conduct further similar studies on larger, more representative samples of pregnant women in Gaza Strip.

[Ahmad A. Elshair, Mona S. Shenouda, and Shadia A. El-Kader. **Gestational Diabetes in UNRWA health clinics in Gaza Strip: Impact of Educational Program.** *N Y Sci J* 2012;5(12):66-72]. (ISSN: 1554-0200). <http://www.sciencepub.net/newyork>. 10

Key words: Birth Trauma, Birth Weight, Blood glucose level, pregnant complications.

Introduction

GDM is marked by high blood sugar levels and is a risk factor for the development of type 2 diabetes later in life. Complications of untreated GDM can be serious and include the development of preeclampsia in the mother and developmental problems, respiratory distress syndrome, and excessive growth of the baby (**American College of Obstetrics and Gynecology, 2001**). GDM can occur as a result of the normal hormonal changes a pregnant woman's body experiences. During pregnancy, the placenta produces hormones that interfere with the actions of the hormone insulin. In a normal pregnancy, the woman's pancreas produces insulin, can compensate for this by making additional insulin during pregnancy. However, if the pancreas cannot keep up with the body's demand for more insulin, GDM may develop (**Schmitz, 2008**).

Simple definition of GDM is glucose intolerance that is first detected during pregnancy (**Metzger, Coustan, 2006**).

GDM complicates about 4% of all pregnancies in the U.S.A, resulting in 135,000 cases annually. The prevalence worldwide nationally may range from 1 to 14% of pregnancies, depending on the population studied. GDM represents nearly 90% of all pregnancies complicated by diabetes. Deterioration of glucose tolerance occurs normally during pregnancy, particularly in the 3rd trimester (**ADA, 2007**).

In these high-risk populations, the recurrence risk with future pregnancies has been reported to be as high as 68%. In addition, approximately one-third will develop overt DM within 5 years of delivery, with higher-risk ethnicities having risks nearing 50% (**Donley et al. 2007**).

Insulin resistance is a normal phenomenon emerging in the second trimester of pregnancy, which progresses thereafter to levels seen in non-pregnant patients with type 2 diabetes. It is thought to secure glucose supply to the growing fetus. Women with GDM have an insulin resistance they cannot compensate with increased production in the β -cells of

the pancreas. [Placental hormones](#), and to a lesser extent increased [fat](#) deposits during pregnancy, seem to mediate insulin resistance during pregnancy. [Cortisol](#) and [progesterone](#) are the main culprits, but [human placental lactogen](#), [prolactin](#) and [estradiol](#) contribute too (Carr, Gabbe, 2008). **Conclusion:** The researcher is interested in the study to examine the impact of the educational program of GDM on reducing the prevalence and health problems to both mother and infants

Regional prevalence of GDM:

The recorded prevalence of GDM ranged from 20% in the United Arab Emirates (UAE) to 5% in urban Iran: very high prevalence rates were observed in Saudi Arabia (12.5% - 17%), Bahrain (13.5%) and the UAE (19.6%) 19 and medium to high levels were observed in different studies in Iran 4.7% - 8.9%. (Hossein-Nezhad, 2007).

According to the annual report of Ministry of Health-Primary Health Care (MOH-PHC 2006) the prevalence of GDM in Gaza Strip is 5.5%. (MOH-PHC-Women Health. Health Status in Palestine 2005 October 2006).

Research hypotheses:

Pregnant women who will receive the educational program will have higher post-test knowledge and practices scores related to GDM than those who do not.

2- The prevalence of problems associated with GDM in pregnant women receiving the educational program will be lower than these among pregnant women than those who do not.

2. Matrial and Methods

Aim of the study:

The study was focused on examine the impact of educational program in reducing the GDM problems among pregnant women.

Research design

A quasi-experimental design was used in the current study (pre/post-test design), single group is studied.

Sample:

The sample consisted of 188 participants, 101 control group and 87 study group which received the educational program.

Setting:

The study conducted in UNRWA clinics Gaza Strip (Rimal, Nusirat and Kanyounis)

Subjects: The newly diagnosed and registered pregnant women as gestational diabetes in the assigned clinics during eight months starting from 1st of Feb. 2011 to 31 August 2011, the first four month for the control group, and the others to the study group who received the interventional education program.

Tools for Data Collections:

Data collected through three tools, Structured Questionnaire for socio-demographic, obstetric history

in the past, current and post delivery history, filled at the first meeting with the participants, and completed the postnatal section at the postnatal visit, pre-post test for Knowledge and practices of the participants, filled to the study and control group after diagnosis of GDM and for the study group refilled of the posttest and the end of the educational program. Medical health records used to record results of pregnant weight, blood sugar values, infant weight and other data.

. Validity & reliability:

Content validity was done to identify the degree to which the used tools measure what it was supposed to measure. Tools developed by the investigator were examined by a panel of eight experts to determine whether the included items clearly and adequately cover the domain of content addressed. The percentage of consensus among experts regarding the structured interviewing questionnaire was 91% and the pre-post test was 89%.

Test-retest (The test is repeated to the same sample of pregnant women with GDM on two occasions and then compares the scores obtained by computing a reliability coefficient). To test reliability, Cronbach's coefficient alpha was used (The normal range value of this test range between 0.0 and + 1.0), and higher values reflects a higher degree of internal consistency (George & Mallery, 2003). The Cronbach's coefficient alpha was 0.752. This value is considered high; which indicates reasonable reliability of the questionnaire. To measure the correlation coefficient between odd and even responses of questions related to knowledge included in the pre-post test, split half method was used to measure this correlation. The Spearman-Brown Correlation Coefficient for the pre-post tests was 0.864.

Educational Intervention Program:

The educational intervention program constructed by the researcher using different strategies, educational booklet and educational sessions in individual basis, small and large group in the three assigned clinics.

The educational program was constructed by the investigator using different strategies. The researcher evaluated the research methodology and selected the randomized clinical trials and findings of the selected articles were analyzed to evaluate the validity of these findings. Consistencies, inconsistencies, and gaps were identified and the items needed to be included in the educational program were identified.

The constructed program was evaluated; took all comments into consideration and modified the program accordingly. Then, an educational booklet was designed by the researcher to be handed out to pregnant women during the educational sessions.

Procedure:

The study was started on the 1st of J February 2011 after receiving a written ethical approval from

the research ethical committee of the faculty of nursing, Cairo University as well as from United Nation for Relief and Work Agency UNRWA health department on 13/01/2011 in Gaza Strip to collect data and implement the program at UNRWA Clinics & from the participants. The educational program was constructed by the researcher based on the findings of the revised articles and the recommendations of expert. Questionnaires were collected from the participants during their routine visit to the antenatal care.

Ethical consideration:

Human subject approval received from the board of the college of nursing at Cairo University as well as UNRWA health department in Gaza Strip. Written permission (informed consent) of participation obtained from each participant at the first session. All ethical issues of research were maintained.

- **Written** permission (informed consent) of participation was obtained from each participant at the first session.
- The researcher explain to the participants that no risk or hazards related to the study.
- Each participant was informed that his participation in the study was voluntary and she can withdraw when she want.

The educational program:

The purpose of program is to engage participants to be able at the end of the educational program to: Define with her Owen words GDM.

Causes of GDM. Define the risk factors of GDM. Complications of GDM that may occur to the pregnant women and to her infant. Sign and symptoms of GDM. Diagnosis of GDM and when to test blood sugar to the pregnant women. Treatment of GDM, including personal preparedness, reduction of foods high in sager, physical exercise, drugs, post natal care, prevention and what to do when you know that you are have GDM.

Outline of the program contents:

1. Definition of diabetes mellitus and emphasis in the GDM.
2. The most common risk factors of GDM during pregnancy.
3. Signs and symptoms of GDM that may occur during pregnancy.
4. The most complications that could encounter the mother and her infant (fetus) due to GDM.
5. The importance of diet in treatment and prevention of complications related to GDM.
6. Changing eating and lifestyle modifications to control blood sager in the normal rage.
7. Exercise especially walking three times a week for thirteen minutes improves blood supply and lower blood sugar.
8. Classify to the pregnant with GDM, type of foods to be taken and types to be minimize or omit.

9. Describe the importance of regular follow up at the antenatal clinic and blood testing in regular basis and when requested.
10. Describe the importance of treatment to the pregnant and her fetus.
11. Teach the pregnant women about insulin therapy or any other model of treatment that can describe to her.

Teaching Methods:

- Talk, Group, Role play and Demonstration.

Teaching aids:

- Hand out (Booklet) and Posters.

Learning activities:

- Active participation (asking questions)
- Applying healthy habits, diet regimens compliance with treatment.

Implementation of the GDM educational program:

The implementation of the educational program was on four separate sessions for the intervention group. Cases were into group's 8-10 participants each, and each group session ranged from 30-50 minutes followed by 5-10 minutes for summary and discussion to what has been taught.

The investigator was developed the educational program in Arabic language after review of the related literature.

The program covered the following topics:

- 1- Described the concepts of GDM including definition, risk factors of GDM among pregnant women, signs and symptoms how to avoid the occurrence and reoccurrence of GDM.
- 2- Identify the expected complications of GDM to the mother and her infant, methods of preventing GDM, and how to prevent or decrease complications of GDM.
- 3- Treatment of GDM, how to use treatment, insulin therapy, sits of insulin injection, how to calculate the doses, effectiveness of treatment on pregnant women with GDM in preventing complications and compliance, diet regimen and physical exercise.
- 4- Explain to the participants how to plan to the next pregnancies and ways on how to prevent reoccurrence of GDM and Ways on how to prevent the reoccurrence of GDM in the next pregnancies

Evaluations:

The pre-post test format was used two times; the first was before the program implementation for the control group during data collection period which extend to four months for ethical concern, the second time was for the study group after the implementation of the educational program during their regular visits after registration as GDM cases in the assigned clinics to evaluated the effectiveness of the educational program.

Statistical analysis:

The collected data will be tabulated, and analyzed utilizing the SPSS program. A variety of statistical methods used to analyze the data in this study as percentage, means, t-test, independent t-test, mean, percentage, Level of significance p-value = 0,05, CI 95%.

3. Results:

Table (1) shows that mean age of participants in the study & control group were 32.6, monthly income 395.6\$, family size 5-6 member, , this results was synchronized with a study conducted in Iran by **Azar, Maryam, 2011** which found that more than 24.5% of pregnant women affected by gestational diabetes was over age of thirty years which indicate that age increase the risk of GDM occurrence during pregnancy.

Table (1) Present comparison of mean, SD of socio-demographic characteristics in the study and control group

Variables	Mean (±SD)	Study group (n=87)	Control group (n=101)	p-value
Mothers age in year	Mean (± SD)	34.3 (6.2)	32.6 (6.4)	
Household monthly income (US)	Mean (± SD)	(395.6 266.8)	370.4 (289.8)	
Residence: Camp	(%)	47.1	37.6	0.188
City		52.9	62.4	
Family size	Mean(± SD)	6.7 (3.034)	5.8 (2.5)	0.180
Room number	Mean (± SD)	2.9 (1.2)	2.7 (1.06)	
Mother working	(%)	15	5	0.006

Table (2) The percentage of basic education (either elementary, preparatory or secondary), in the study and control group 65.9% and 80.2% respectively. These results emphasis the needed of the educational program These findings match to the

results of a study of **Glanz, et al (2006)** which indicate that women of university education tend to adhere to healthier behaviors and participate more in teaching sessions.

Table (2) Displays percentage of education level of subjects in the study and control group and their husbands:

Educational level	Participants							
	Study group				Control group			
	Mothers		Fathers		Mothers		Fathers	
	No	%	No	%	No	%	No	%
Elementary	8	9.1	12	13.8	9	8.9	19	18.5
Preparatory	15	17.2	22	25.3	27	26.7	27	26.7
Secondary	39	44.8	33	37.9	45	44.6	30	29.7
University	25	28.7	19	21.8	20	19.8	24	23.8
Higher education	0	0	1	1.1	0	0	1	1.0
Total	87	100	87	100	101	100	101	100

Table (3) Shows that 89.1% and 92.1% of the study and control group respectively are multiparous, while 69.2% and 66.7% were multiparous of five times or more, that indicate the in study group had a slightly

higher numbers of pregnancies and deliveries compared with those in the control group (p-value 0.721) there was no statistically significant difference between the two group.

Table (3) show distribution of percentage of previous pregnancies and delivery among study and control group:

Previous pregnancies	Study group (n=87)		Control group (n=101)		p-value
	No	%	No	%	
Primigravida	9	10.3	8	7.9	0.721
Multi Para	78	89.7	93	92.1	
Para<=5	24	30.8	31	33.3	
Para 5+	54	69.2	62	66.7	
Total	78	100	93	100	

Table (4) shows that the percentage of complications in the previous pregnancy with no statistically deference between study and control group. This result was congruent with the study of **The New England Journal of Medicine June (2005),**

which revealed that stillbirth delivery was between 2.0% and 3.6%, neonatal deaths between 3.1% and 4.9%, low birth weight between 2.9% and 4.5% and abortion between 14% and 15% of the total outcome of the pregnancy.

Table (4) Present previous percentage of pregnancy outcome in the study and control group:

Previous pregnancy outcome	Study group (n=78)%	Control group (n=93)%	p-value
Stillbirth	2.6	3.2	0.798
Neonatal death	3.8	5.4	0.637
Low birth weight	3.8	4.3	0.881
Abortion	14.1	15.1	0.982
Total	24.3	28	

Table (5) shows that the percentage of CS delivery was 10 and 15 participants with percentage of 11.5% and 14.9% from the total number respectively. In the current pregnancy the percentage of CS delivery was 14.1% and 18.2% in the study and control group respectively. , this incongruent of the **UNRWA annual**

report, (2010) with 17% in 2009 and 19% in 2010 respectively, also incongruent with the study of the **New England Journal of Medicine, (N Engl J Med) (2010)** with 31-32% of study sample with caesarian section.

Table (5) Revealed percentage distribution of previous operations among study and control group, and in the current pregnancy.

Operations in previous pregnancy	Study group (n=87)		Control group (n=101)		p-value
	No	%	No	%	
CS	10	11.5	15	14.9	0.837
Others	2	2.3	0	0	
Normal	85	86.2	86	85.1	
Percentage of CS delivery in the current pregnancy					
Normal	71	83.5	76	76.8	0.196
CS	12	14.1	18	18.2	

Table (6) shows that the percentage of birth trauma and complications was decreased in the study group compared the control group. Study of **Farrell, et al., (2002)** was congruent of the results of the study which revealed that 4.6% had congenital anomaly with

significance difference between type I and type II when comparing with GDM, which the percentage in type I and II diabetes has confirmed the incidence of from 5-10% and the incidence of congenital anomaly of GDM had 1.4%.

Table (6) Shows percentage of infant birth trauma or complications during delivery among study and control group in the current pregnancy

Infant birth trauma or complications in the current pregnancy	Study group (n=10)		Control group (n=18)		p-value
	No	%	No	%	
Infant birth trauma	10		18		0.544
Dislocated shoulder	1	10	0	0	
Hypoxia	1	10	2	11.1	
Hypoglycemia	4	40	6	33.3	
Respiratory problems	2	20	3	16.7	
Tubal neural defect	1	10	1	5.6	
Cord prolapsed	0	0	1	5.6	
Still birth	0	0	1	5.6	
Prolonged labor	0	0	2	11.1	
Preterm labor	0	0	1	5.6	
Post date labor	1	10	1	5.6	
Total	10	100	18	100	

In the post natal care the percentage of women who came and done postnatal care and physical exam were 97.7% and 98.02% in the study and control group respectively.

Regarding the knowledge which gain the participants, the number of pregnant women in the study group (pre and posttest) and control group who answered each the (20) questions specified for measurement of subject's knowledge regarding the problem of GDM in pregnancy was demonstrated. Measurements of the difference between answers for each question for pregnant women in the study group in pretest and posttest as well as between pregnant women in the control group and posttest responses of pregnant women in the study group also were presented.

The first eight question answers of pregnant women in the study group pre and posttest were in total there a significance improvement, regarding the correct answers knowledge of the pregnant women such as the knowledge of the normal value of the blood sugar with 18.39% in the pre test and 47.13% in the post test, regarding the organ of insulin secretion the pretest was 40.23% and posttest 83.91%, the relation of pregnancy and GDM 22.99% and 51.72 in the pre-post respectively, knowledge of pregnant women that post GDM may develop to type 2 diabetes 44.83% and 83.91 in the pre-post test respectively, (p-value 0.000) with statistical significance between pre-posttest at (p-value α 0.05)

The results shows that the knowledge of the pregnant women in the intervention group regarding the diet, treatment, antenatal care, blood sugar testing, problems and complications has changed dramatically after the intervention of educational program from those pregnant women in the control group (p-value 0.000).

Regarding answers, the participant selected one of the three alternative options which were almost, sometimes and rarely, the results shows that there an improvement in mean of the post test of the intervention group regarding the pre test of both group. Practice was assessed in terms of foods consumption which includes foods low in sugar and carbohydrate, taking the diabetes treatment as prescribed, came to the antenatal care regularly, testing of blood sugar when requested and it was statistically significant with (p-value 0.000 and 0.004). Regarding the questions (10, 11, 12) the p-value rang between (0.045 and 0.049), which considered lowered of statistically significance comparing of other questions. The question (19) was not statistically significance with (p-value 0.0513).

4. Discussion

The study conducted to assess the effect of educational program in reducing complications of GDM to the pregnant women & her infant & to decrease the provenance of GDM. The results of the

study can supported the two hypotheses which decreased the prevalence of complications by controlling blood glucose level, diet regimen, exercise, compliance with the treatment and regular follow up in the antenatal care. Regarding the knowledge the study shows that the participants in the study gain knowledge through their participation in the educational program sessions in individual or in group, this was reflected by their answers to the posttest with p-value (0.000 to 0.028) with statistically differences between the pretest of both study and control group. A study of **Schaefer et al., (2005)**, revealed that health education either by individual basis or group session affect and make participants change their life style and modify to a healthy habits.

Regarding practices of the pregnant women results shows that also improvements occurred regarding changing practices into healthy behaviors adopted healthy eating habits, results show statistically dereference in all questions with p-value (0.000 to 0.049), except the question (19) search about in formations related to GDM by reading (p-value 0.513) with statistically not significance deference, the researcher referred that to the educational level of the participants which considered low and absent of the desire to reading or searching information. The results was congruent with the study of **Artal et al. (2007)** A lifestyle intervention of weight-gain restriction: diet and exercise in obese women with gestational diabetes mellitus, which indicate that behavior and practice through participation in the educational sessions.

Conclusion and Recommendations:

The study concluded that the educational program of mothers about GDM had improved their knowledge and practice, and decreased the associated health problems among mothers and pregnancy outcomes.

According to the results of the current study, the following recommendations are suggested:

1. Educational program to increase the awareness of the pregnant women at prenatal clinics, the program should planned in means of each session conducted the pregnant women should informed before the date or given an appointment date and time.
2. At the end of session provide pregnant women with educational booklet about practices and diet, exercise, compliance with the treatment to improve their health and prevent complications.
3. Social services that offer food supplement. Consideration to families of low income should have representatives at major MCH clinics to ensure availability and adequacy of food.
4. The teaching and consoling should start as early as puberty by providing awareness campaigns to students at schools, to reach

productive age safely.

5. Mass media coverage, focused on the importance of GDM problem during pregnancy and the consequences of practices regarding should be implemented.
6. National and local studies are needed to assess the magnitude of GDM in Palestine to confirm the current results.
7. Conduct further studies to explore the impact of other risk factors such as obesity, maternal age on pregnancy outcomes.
8. Open telephone to answer the questions of pregnant women 24 hours per-day regarding their health.
9. Training program to nurses and midwives to improve their abilities and increase their knowledge.

Corresponding author

Ahmad A. Elshair

UNRWA, Health Program, Nursing Department- Gaza
ahmadelshair@yahoo.com

References:

1. American College of Obstetrics and Gynecologists Committee on Practice Bulletins-Obstetrics: Gestational diabetes. Number 30, September 2001. *Obstet Gynecol* 98:525-538, 2001
2. American Diabetes Association(ADA). Standards of medical care in diabetes--2007. *Diabetes Care*. Jan 2007;30 Suppl 1:S4-S41. [Medline].
3. Artal R, Catanzaro RB, Gavard JA, Mostello DJ, Friganza JC. A lifestyle intervention of weight-gain restriction: diet and exercise in obese women with gestational diabetes mellitus. In: *Applied Physiology, Nutrition & Metabolism*: NRC Research Press; 2007:596-601.
4. American College of Obstetrics and Gynecologists Committee on Practice Bulletins-Obstetrics: Gestational diabetes. Number 30, September 2001. *Obstet Gynecol* 98:525-538, 2001
5. American Diabetes Association(ADA). Standards of medical care in diabetes--2007. *Diabetes Care*. Jan 2007;30 Suppl 1:S4-S41. [Medline].
6. Artal R, Catanzaro RB, Gavard JA, Mostello DJ, Friganza JC. A lifestyle intervention of weight-gain restriction: diet and exercise in obese women with gestational diabetes mellitus. In: *Applied Physiology, Nutrition & Metabolism*: NRC Research Press; 2007:596-601.
7. Azar Aghamohammadi and Maryam Nooritajer (2011). Maternal age as a risk factor for pregnancy outcomes: Department of Midwifery, Sari Branch-Iran. (Vol. 5(2), pp. 264-269), Islamic Azad University.
8. Carr DB, Gabbe S. Gestational Diabetes: Detection, Management, and Implications. *Clin Diabetes* 2008; 16(1): 4.
9. Donley P, Walwyn L, Scudamore I, Gregory R. Long term prognosis of women with gestational diabetes in a multiethnic population. *Postgrad Med J*. Jun, 2007.
10. George D. & Mallery P., 2003, SPSS for window Step by Step, fourth edition.
11. Glanz, K., Lewis, F.M., & Rimer, B.K. (Eds.) (2006). *Health Behavior and Health Education: Theory Research and Practice*. San Francisco, CA: Jossey-Bass Publishers.
12. Hossein-Nezhad,, *Prevalence of gestational diabetes mellitus and pregnancy outcomes in Iranian women*. *Taiwan J Obstet Gynecol*, 2007. 46(3): p. 236-41.
13. Metzger BE, Coustan DM, Organizing Committee. Summary and recommendations of the Fourth International Workshop-Conference on Gestational Diabetes Mellitus. *Diabetes Care* 2006;21:Suppl 2:B161-B167.
14. MOH-PHC-women health. Health Status in Palestine 2005 October 2006.
15. **New England Journal of Medicine** *N Engl J Med*. Author manuscript; available in PMC 2010 January 12. A Multicenter, Randomized Trial of Treatment for Mild Gestational Diabetes, *N Engl J Med*. 2009 October 1; 361(14): 1339-1348. doi:10.1056/NEJMoa0902430.
16. Schaefer-Graf UM, Pawliczak J, Passow D, et al. Birth Weight and Parental BMI Predict Overweight in Children From Mothers With Gestational Diabetes. In: *Diabetes Care*; 2005:1745-50.
17. Schmitz, T. (2008). For universal screening of gestational diabetes mellitus. *Gynecol Obstet Fertil*, 36, 567-569.
18. T. Farrell, L. Neale and T. Cundy, Congenital anomalies in the offspring of women with Type 1, Type 2 and gestational diabetes. Department of Medicine, Faculty of Medicine & Health Sciences, University of Auckland, and Diabetes Pregnancy Clinic, National Women's Hospital, Auckland, New Zealand *Accepted 19 October 2002*.
19. UNRWA Annual Report, 2010

9/29/2012