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Diabetes Mellitus Status Among Registered Pregnant Women in Primary Health Care Centers in the Southern of Gaza Province, Palestine

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بسم الله الرحمن الرحيم

﴿ وَكَأَيِّن مِّنْ ءَايَةٍ فِي السَّمواتِ وَالأَرْضِ يَمُرُّونَ عَلَيْهَا وَهُمْ عَنْهَا مُعْرِضُونَ ﴾

صدق الله العظيم

" سورة يوسف آية 105 "

Dedication

To Mohy El-Din El-Farra, my loyal, patient friend and husband ; our four Daughters, Reem, Rajha, Reham, Rozan ; my Mother and my Father, for their Love and Continuous Support.

To each martyr and each injured person who paid the highest price in the AL- AQSA INTIFADAH, *for the beloved land of Palestine.*

OLFAT SHA'AT

November, 2000

Abstract

Data on diabetes with pregnancy in Palestine are not available and such information is needed. Diabetes mellitus with pregnancy is under-reported in the local community, although risk factors associated and enhancing diabetes mellitus with pregnancy are highly prevalent. The objectives of the study aim to identify diabetes mellitus status among registered pregnant women in primary health care centers of MoH and UNRWA in the Southern area of Gaza Province.

This is a cross sectional - case control study for 84 diabetic pregnant women matched with 168 healthy pregnant women selected randomly, parity order of 2 or more and routinely screened for blood glucose test. Data collection was carried out using an administrated interview questionnaire, review of all maternal health records and observation of body weight, height and blood pressure.

The main results show that the reported period prevalence of diabetes mellitus (DM) among the study population was 0.49%, 0.41% and 0.36%, 0.29% for gestational diabetes mellitus (GDM) in the year 1999 and first half of the year 2000 respectively.

There is a strong association between the four risk factors considered in this study (maternal age, family history of diabetes mellitus, obesity and parity order) among diabetics, GDM in comparison to non-diabetic women. The maternal age of 31 years and older was 85.7%, 90.0% and 42.3% in diabetic group, GDM subgroup and control group respectively. The positive family history of diabetes mellitus was reported 72.6%, 70.0% and 39.9% in diabetic group, GDM subgroup and non-diabetic group respectively. Obesity (BMI ≥27) was 80.9%, 85.0% and 52.4% in diabetic group, GDM subgroup and non-diabetic group respectively. Parity order of ≥6 was 70.2%, 75.0% and 28.0% in diabetic, GDM comparing to non-diabetic women group.

The results also indicated that there is a statistical significant relationship between the diabetic women and the exposure to undesired outcome in previous pregnancies (repeated abortions, still birth, macrosomia and low birth weight) compared to non-diabetic group.
There is a strong association between diabetic women and exposure to adverse maternal and fetal outcome compared to non-diabetic women.

In the last pregnancy, there is a statistical significant relationship between the diabetic and control group and the late registration of first antenatal visit. The tendency of diabetic mothers to deliver low birth weight babies was higher than mothers without diabetes mellitus 24% vs. 10% and macrocosmic babies 35% vs. 14%, an association had been showed between babies' birth weight and treatment by insulin.

The results exposed the lack of knowledge among pregnant women on health events leading to risky pregnancy, symptoms and complications of diabetes mellitus with pregnancy. Eighty percent of pregnant women were comfortable and satisfied as regards to the existing antenatal and postnatal services.

The findings indicate the importance of early registration, screening tools, blood glucose testing, insulin treatment as prophylactic measure and quality of health education programs for diabetes with pregnancy.

Diabetes health status in pregnant women is enhanced by good antenatal care at frequent intervals with early detection and treatment for good outcome with minimal morbidity and no mortality for mother, fetus and newborn. Thus it should be encouraging for all pregnant women in the future.

ملخص

هذه دراسة حول أبعاد داء البول السكري أثناء الحمل عند السيدات الحوامل المسجلات لدى عيادات الرعاية الأولية في المنطقة الجنوبية لقطاع غزة (محافظة خان يونس ورفح) لدى وزارة الصحة الفلسطينية ووكالة الغوث من ١ – ١ – ١٩٩٩م إلى ٣٠ – ٦ – ٢٠٠٠م .

مقدمة :

إن تواجد مرض البول السكري أثناء الحمل هو من اكثر العوامل الخطرة شيوعاً التي قد تصيب السيدات في مختلف مراحل العمر . هذا التواجد قد يؤدي إلى تأثيرات مختلفة سواء في الأم والجنين أو المشيمة. بالنسبة للأم فهدا يؤدي إلى زيادة الحاجة إلى الأنسولين، زيادة في تجمع السائل الامنيوسي ، حدوث ولادة مبكرة، زيادة نسبة التهابات الكلى ومجرى البول وكذلك زيادة نسبة حدوث تسمم الحمل ، بالنسبة للجنين فهي تؤدي إلى زيادة في حجم الجنين، تشوهات خلقية، زيادة فرصة حدوث وفاة داخل الرحم وكذلك اضطرابات تنفسية بعد الولادة مباشرة. إن الغرض الأساسي من علاج السيدات الحوامل المصابات بداء السكري البولي هو الحصول على طفل سليم وأم سليمة أثناء الحمل وبعد الولادة. ولتحقيق هذا الهدف يجب على الطبيب وعلى المريضة اتباع الآتي :

- التحكم في داء البول السكري قبل وأثناء الحمل وكذلك بعد نهاية الحمل .
- منع المضاعفات عن طريق المتابعة الجيدة المتكررة للسيدة الحامل .
- التشخيص المبكر والعلاج السريع الفعال لأي مشاكل طبية قد تطرأ .
- الاختبار الدقيق لميعاد وطريقة الولادة .

منهجية البحث:

هذه الدراسة هي دراسة وصفية تحليلية لدراسة أبعاد داء البول السكري أثناء الحمل وخاصة الداء السكري الحملي ... في عيادات الرعاية الصحية الأولية وعددها ٢ عيادة مركزية لدى الوزارة (مركزي شهداء خان يونس ورفح) و ٤ مراكز صحية ومركز أخر فرعي في رفح لدى وكالة الغوث (عيادة خان يونس، عيادة معن، عيادة رفح، عيادة تل السلطان والمركز الفرعي في الشابورة) .

هذه العيادات تُقدّم فيها خدمات الأمومة والطفولة وخدمات الرعاية الصحية الأولية والأمراض المزمنة الغير معدية وخدمات تنظيم الأسرة .

هذه الدراسة أجريت على مجموعتين من الحوامل ، المجموعة الأولى التي أجريت عليها الدراسة حوامل مصنفات بداء البول السكري أو داء السكري الحملي (المريضات) وسجلت في مراكز الصحة الأولية وتتكون من ٨٤ سيدة، المجموعة الثانية حوامل مسجلات خاليات من داء البول السكري (أصحاء) وتتكون من ١٦٨ سيدة . روعي في اختيار المجموعة الثانية أن تكون قبل وبعد الرقم المسجل المسلسل للسيدات

المصنفات بداء السكري البولي من المجموعة الأولى ، وأن تكون حامل مرتين أو اكثر وفي نفس المركز الصحي وتسكن في نفس منطقة الدراسة وتوظف في الدراسة بعد موافقتها بالمشاركة.

استخدم في إجراء المقابلة رسالة توضيحية لموضوع البحث والأمور الأخلاقية واستبيان مركب باللغة العربية وقد استخدم مع المقابلة كأداة لجمع المعلومات من الأمهات حيث تم جمع بعض المعلومات من ملفات الأمهات لدى عيادات الأمومة والحمل الخطر ، بينما تم جمع باقي المعلومات من الأمهات أنفسهن مما يزيد من تأكيد دقة المعلومات وتم إجراء القياسات الآتية : قياس الطول ، الوزن والضغط . وقد تم جمع المعلومات من الأمهات خلال ساعات الدوام الرسمية للمراكز الصحية ، ٢٠ سيدة أجريت لهن المقابلة في منازلهن لصعوبة الوصول لهن . وقد تم استخدام البرنامج الإحصائي (EPI6- info) في تدخيل وتحليل المعلومات.

الأهداف المرحلية :

- قياس معدل انتشار الحالات المعروفة للداء السكري أثناء الحمل والداء السكري الحملي والمسجلات لدى مراكز الرعاية الصحية الأولية في المنطقة الجنوبية بقطاع غزة.
- إيجاد نسبة انتشار عوامل الخطر المختلفة المصاحبة لحدوث داء السكري أثناء الحمل وداء السكري الحملي خاصة.
- دراسة التأثيرات المختلفة لداء السكري مع الحمل سواء في الأم أو الجنين.
- دراسة تقييم عامل الخطر عند السيدة الحامل من النماذج الخاصة بتقييم الحوامل في مراكز الأمومة والحمل الخطر .
- تقييم معرفة وممارسة الأمهات الحوامل ورضائهن عن الخدمات المقدمة .
- إيجاد العروض المناسبة لتوحيد الخدمات المقدمة لصحة الأم بين وزارة الصحة الفلسطينية ووكالة الغوث.

النتائج:

أوضحت نتائج الدراسة أن معدل انتشار داء السكري البولي مع الحمل المسجل ٠,٤٩% و٠,٤١% في ١٩٩٩ والنصف الأول من سنة ٢٠٠٠ على التوالي . ومعدل انتشار داء السكري الحملي ٠,٣٦%, و٠,٢٩%, في ١٩٩٩ والنصف الأول من سنة ٢٠٠٠ على التوالي .

- وجد انتشار عوامل الخطر عند السيدات الحوامل (عمر السيدة ، السمنة ، الحمل المتكرر اكثر من ٦ ولادات وداء السكري عند العائلة) مرتبطة ارتباطاً إيجابياً مع السيدات لدى داء السكري الحملي. وتزداد بمعدل عوامل الخطر .
- وجد أن عامل السمنة بقدر ٦١,٩% عند كل حالات الدراسة بينما ٨٥,٩% عند السيدات لدى داء السكري الحملي كذلك وجد ارتباط إيجابي بين عامل السمنة وتعرض السيدة لداء السكري الحملي .
- ووجد أن عامل الحمل المتكرر اكثر من ٦ مرات وتعرض السيدة لداء السكري أثناء الحمل أو داء السكري الحملي له ارتباط إيجابي بقدر ٦ ، ٧ مرات على التوالي مقارنة بالأم الحامل اقل من ٦ ولادات .

- ولقد أظهرت نتائج الدراسة أن الأجنة لدى أمهات داء السكري مع الحمل تتعرض للإجهاض المتكرر مرتان أو أكثر بنسبة ٤٥,٢% مقارنة بـ ١٧,٣% عند الأمهات السليمات (الخاليات من داء السكري الحملي) ، ووجد أن نسبة وفاة الأجنة في الرحم عند الأمهات المريضات(٢٩,٨%) أعلى من الأمهات السليمات (٦%) ويزداد معدل الارتباط الإيجابي لدى أمهات داء السكري الحملي بمعدل ٣٥%.
- ولقد وجد أن كبر حجم الجنين (أكبر من ٤ كيلوغرام) عند الأمهات المريضات بمعدل ٥٤,٨% أعلى من الأمهات السليمات ١٦,١% وأن هذه العلاقة ترتبط ارتباطاً إيجابياً بتعرض الأم لداء السكري البولي أثناء الحمل ، بينما وجد أن صغر حجم الجنين (أقل من ٢,٥كيلوغرام) لدى الأمهات المصنفات بداء السكري الحملي بنسبة ٢٥% مقارنة بـ ٢٠,٨% في الأمهات السليمات وأن هناك إيجابية إحصائية ذات أهمية مع داء السكري الحملي.
- وجد ارتباط إيجابي بين الأمهات المريضات وتعرضهن لمضاعفات الحمل عندهن (ولادة متعسرة ، نزيف، وفاة الجنين داخل الرحم، وارتفاع الضغط أو تسمم الحمل) ، بينما وجد ارتباط إيجابي بين الأمهات المريضات وتعرضهن للضغط أو مع تسمم الحمل ٤٠,٥% بمعدل أعلى عن الأمهات السليمات ١٤,٣% .
- ولقد أظهرت الدراسة أن فقدان الحمل الأخير (إجهاض+ وفاة الجنين + تشوه خلقي) وجد بمعدل أعلى عند الأمهات المريضات ١٧,٩% و ٦% من السليمات . وأن أجنة الأمهات المريضات تتعرض لتشوهات خلقية ٦ مرات أضعاف الأمهات السليمات. وأيضاً وجد ارتباط إيجابي بين نسبة وفاة الأطفال ١ – ٢٨ يوم ، خلال سنة وارتفاع نسبة وفيات الأطفال عند الأمهات المريضات مقارنة بالسليمات.
- ولقد أظهرت نتائج هذه الدراسة أن هناك تأخير في تسجيل أول زيارة إلى مركز الأمومة للسيدات الحوامل عامة وعند الأمهات لدى داء السكري الحملي خاصة، حيث أن أكثر من نصف المريضات (٥٧,١%) كانت أول زيارة بعد ١٢ أسبوع من الحمل من بينهن ٨,٣% كانت عند أو بعد ٣١ أسبوع ، وكانت العلاقة إيجابية مقارنة بالأمهات السليمات ، وأن ٥٧,١% من الأمهات لدى داء السكري الحملي تم عمل أول فحص للسكر في الدم عند أو بعد الأسبوع الثاني عشر من الحمل من بينهن ٢٧,٤% ما بين ١٣ – ٢٠ أسبوع من الحمل و ٨,٣% بعد ٣١ أسبوع من الحمل.
- لقد أظهرت الدراسة أنه لا يوجد اختلاف بين أداء العاملين بالرعاية الصحية الأولية على اختلاف مواقعهم في مراكز الأمومة والحمل الخطر في تقييم وتسجيل عوامل الخطر عند السيدات الحوامل.
- ولقد أظهرت الدراسة أن معرفة الأم بالعوامل التي تؤدي إلى الحمل الخطر ومعرفة داء السكري البولي مع الحمل (أعراضه ومضاعفاته) كانت ضعيفة.
- وأن ٨٠% من الأمهات راضيات عن الخدمات المقدمة في مراكز الأمومة ورعاية الحوامل ، بينما ٩٨,٤% أكدوا على أهمية التردد على عيادة الأمومة لأهميتها في الاكتشاف المبكر لأي مرض بنسبة ٩٦% وخدمات المختبر التشخيصية بنسبة ٩٣%. ولقد وجد أن ٢٠% من الأمهات يعانون من مشاكل في الخدمات المقدمة أهمها : طول وقت الانتظار بقدر ٣٨ % ، المواعيد بقدر ١٧,٣% ، الخدمات المخبرية بقدر ١٠,٦% وخدمات الموجات فوق الصوتية بقدر ٥٩,٩% بينما الغالبية من الأمهات طلبن توحيد الخدمات المقدمة في كل من وزارة الصحة الفلسطينية ووكالة الغوث في قطاع غزة .

التوصيات :

- تقصي الداء السكري البولي مع الحمل في مراكز الأمومة بالرعاية الصحية الأولية على أن يكون ذلك في أول زيارة للأم الحامل ، وتوحيد المعايير التشخيصية لداء السكري البولي مع الحمل .
- إيجاد أسلوب متكامل للرعاية السكرية من خلال الرعاية الصحية الأولية.
- التثقيف المجتمعي حول داء السكري البولي مع الحمل بمساعدة الدوائر المعنية مثل دائرة الصحة المجتمعية ، دائرة صحة المرأة ، دائرة الصحة المدرسية وبمساعدة الإعلام العام المرئي منه والمسموع والمقروء.
- تدريب العاملين الصحيين سواء في الرعاية الأولية أو الثانوية على برامج داء السكري البولي بشكل عام وداء السكري البولي مع الحمل بشكل خاص.
- إجراء دراسات بحثية مستقبلية عن داء السكري البولي مع الحمل.

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Definition

Albumin: A protein found in blood plasma and urine. The presence of albumin in the urine can be a sign of kidney disease.

A registry: Is a valuable tool in every day clinical work (decisions on the treatment regime, assessment of complication , evaluation of trends).

Autoimmune process: A process where the body's immune system attacks and destroys body tissue that mistakes it for foreign matter.

Blood glucose: The main sugar that the body makes from the food we eat. Glucose is carried through the bloodstream to provide energy to all of the body's living cells. The cells cannot use glucose without the help of insulin.

Blood pressure: The force of the blood against the artery walls. Two levels of blood pressure are measured: the highest, or systolic, occurs when the heart pumps blood into the blood vessels, and the lowest, or diastolic, occurs when the heart relapses.

Body mass index (BMI): Is defined as body weight in kilograms divided by the square body height in meters.

Carbohydrates: Natural sugars found in foods.

Compliance: The term has been defined by WHO as Faithful adherence by the patient to the prescribed instructions" (who, 1998). The concept of compliance can be viewed, as it relates to instructions concerning diet, rest, appointments, early registration, laboratory investigation, frequent antenatal visits, in addition to use of drugs (Insulin) and hospital delivery.

Desired outcome: The normal delivery of a mature alive healthy baby with normal body weight of infant 250 - < 4000 kg.

Diabetes: The short name for the disease called diabetes mellitus. Diabetes results when the body cannot use blood glucose as energy because of having too little insulin or being unable to use insulin.

Fasting: Is defined as no caloric intakes for at least eight hours.

Gestational Diabetes (GDM): Is defined as glucose intolerance of variable degree with onset or first recognition during the present pregnancy.

Hemoglobin A1c: A test that sums up how much glucose has been sticking to part of the hemoglobin during the past 3–4 months. Hemoglobin is a substance in the red blood cell that supplies oxygen to the cells of the body. It is produced by non-enzymatic condensation of glucose molecules with free amino groups on the globin component of hemoglobin.

High blood pressure: A condition where the blood circulates through the arteries with too much force. High blood pressure tires the heart, harms the arteries, and increases the risk of heart attack, stroke, and kidney problems.

Hormone: A chemical that special cells in the body release to help other cells work. For example, insulin is a hormone made in the pancreas to help the body use glucose as energy.

Hypoglycemia: Low amounts of sugar in the bloodstream.

Impaired fasting glucose: Impaired fasting glucose is a new diagnostic category in which persons have fasting plasma glucose values of 110-125 mg/dL. These glucose values are greater than the level considered normal but less than the level that is diagnostic of diabetes.

Indicators: The health events, which occurred more commonly among diabetics' pregnant women than others.

Infant mortality rate: The number of infant deaths (under one year of age) in a given year per 1,000 live births during the year.

Insulin: A hormone that helps the body use blood glucose for energy. The beta cells of the pancreas make insulin. When people with diabetes can't make enough insulin, they may have to inject it from another source.

Integration/Integrated Services: This refers to a program that combines family planning services with maternal and child health, nutrition, immunization, and other reproductive health services, such as control and treatment of sexually transmitted diseases.

Live birth: A birth is considered live birth if the newborn should, cry or show any characteristics of life at birth .

Macrosomia: Condition where the baby grows to an excessively large size and more 4000 grams.

Maternal mortality rates: The number of female deaths due to pregnancy, birth complication and perpurium per 100, 000 live births.

Nephropathy complications: Diagnosis by microalbuminuria is an early sign, but macro albuminuria is a definite diagnosis of diabetic nephropathy.

Neuropathy complications: Diagnosed by the presence of one or more of the following symptoms, pain at the site of peripheral nerves, loss of sensation, numbness, burning sensation, muscular weakness, neuropathoic arthopathy, impotence and bladder dysfunction, postural hypertension, dizziness and chronic headache.

Obesity : Is defined as prepregnancy body mass index (BMI ≥ 27).

Pancreatic Beta cells: Cells that make insulin. Beta cells are found in areas of the pancreas called the islets of Langerhans.

Placenta: Filtering system between mother and baby; sugar passes through it into the baby's blood stream. Insulin does not pass through the placenta.

Prevalence: Is the number of affected persons at a specified point in time.

Polyhydramnios: Condition where there is excess fluid in the sac surrounding the baby.

Preeclampsia: Hypertension plus Proteinuria above 0.5 gm/2hh on two occasions.

Respiratory Distress Syndrome: When newborn babies have difficulty breathing because of underdeveloped lungs.

Retinopathy complication: it is a highly specific vascular complications of Type I and Type II diabetes. Characterized by hemorrhages, hard yellow exudes, or retinal detachment, vitreous hemorrhage, growing of new vessels or fibrosis of the retina.

Risk factors: Traits that make it more likely that a person will get an illness. For example, a risk factor for getting Type 2 diabetes is having a family history of diabetes.

Symptoms: Are the classic ones of polyuria, polydipsia and unexplained weight loss.

Toxemia: Disorder that develops during pregnancy that puts the mother and baby at risk. Symptoms include swelling and high blood pressure.

UNRWA Agency-wide: UNRWA health services provided to Palestine refugees in the Near East, areas of collection (field) (Gaza Province, West Bank, Jordan, Syria and Lebanon).

Yeast infection: A vaginal infection that is usually caused by a fungus. Women who have this infection may feel itching, burning when urinating, and pain, and some women have a vaginal discharge. Yeast infections occur more frequently in women with diabetes.

List of Abbreviations

2hPG,2-h	Post Load Glucose
ADA	American Diabetic Association
ANC	Antenatal Care
BBW	Baby Birth Weight
CA	Congenital Anomaly
CFMF	Congenital Fetal Malformation
CS	Caesarian Section
DM	Diabetes Mellitus
FPG	Fasting Plasma Glucose
GCT	Glucose Challenge Test
GDM	Gestational Diabetes Mellitus
HB A1	Hemoglobin A1c
HCS	Human chorionic Somatomam-motropinn
HP	Health professional
HRC	High Risk Center
IDDM	Insulin Dependant diabetes Mellitus
IFG	Impaired Fasting Glucose
IGT	Impaired glucose Tolerance
IUFD	Intrauterine Fetal Death
LBW	Low Birth Weight
LGA	Large for Gestational Age
MAS	Ma'had Abhath As-Syasat

MCH	Mother and Child Health
MGH	Mild Gestational Hyperglycemia
MHRs	Maternal Health Records
MIS	Management Information System
MNT	Medical Nutrition Therapy
MODY	Mature Onset of Diabetes Mellitus in Young
MoE	Ministry of Education
MoH	Ministry of Health
NCD	Non Communicable Disease
NIDDM	Non Insulin Dependant Diabetes Mellitus
OGTT	Oral Glucose Tolerance Test
PCBS	Palestinian Central Bureau Statistic
PHC	Primary Health Care
PIH	Pregnancy Induced Hypertension
PNA	Palestinian National Authority
RDS	Respiratory Distress Syndrome
SGA	Small for Gestational Age
SMBG	Self-Monitoring of Blood Glucose
SVD	Spontaneous Vaginal Delivery
UNRWA	United Nations Relief and Works Agency
WB	West bank
WHO	World Health Organization

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Gaza Province
Area : 370 km^2

Chapter 1
Introduction

Chapter 1

Introduction

Pregnancy and childbirth are special events and exciting times in women's lives and indeed in the lives of their families. This should be a time of great hope and joyful anticipation. It can also be a time of fear, suffering and even death.

Although pregnancy isn't a disease but a normal physiological process and pathological changes, it carries certain health risks for both women and the infant they bear. These risks are present in every society and setting. We know that interventions are needed to ensure safe pregnancy and childbirth.

Investment in women's health promotes equity and economic efficiency, with widespread benefits for this generation and the next. Women's disproportionate poverty, low social status, and reproductive role expose them to high health risks, resulting in needless and largely preventable suffering and death (World Bank, 1994).

Women's health and nutritional status are a national as well as an individual welfare concern as it affects the next generation, through impact on their children and economic productivity.

Diabetes Mellitus is one of common non-communicable diseases worldwide, especially in developing countries including Palestine. Diabetes is a disorder in which the body does not produce enough insulin or does not utilize insulin properly. WHO stated that, Between 1995 and 2025 the number of the

adult population affected by diabetes mellitus in developing countries is projected to grow by 170% from (84 - 228 million) people. The developing countries by 2025 will be home to 76% of all diabetics, as compared with 62% in 1995. In the same period, the developed world will see 41% increase (51-72 million) people. Worldwide, 122% rise is projected, from a total of 135 to 300 million. This global increase by more than two fold will occur because of population aging and growth, as well as from obesity, unhealthy diets and a sedentary lifestyle. These later factors are closely associated with urbanization and industrialization (WHO, 1998).

Different types of diabetes mellitus will occur in general population. In pregnancy two types of diabetes mellitus are identified pregestational and gestational diabetes mellitus.

Gestational diabetes mellitus is defined as any degree of glucose intolerance with onset or first recognition during pregnancy (ADA, 2000), which is one of the commonest health event has negative effect on women's health during reproductive age period (15 - 45 years).

Women, who suffer of diabetes mellitus, have increased chance to develop problems for themselves and their babies as diabetes during pregnancy could cause serious maternal and fetal complications (Orland, 1995; ADA, 2000). Today most pregnant diabetics look to have healthy babies, early detection and early treatment, in addition to recent advances in the management of pregnancies complicated by diabetes are the effective tools to reduced the risks associated with diabetes.

It was chosen to study diabetes mellitus among pregnant women in local community as a subject for review and evaluation from various aspects:

numbers of registered pregnant women with diabetes mellitus; prevalence of common predisposing factors that are associated and enhancing development of diabetes mellitus with pregnancy, reported complications; utilization of existing health services and areas of possible interventions for prevention and control of diabetes complications.

Worldwide data on prevalence of various types of diabetes in pregnancy are not available. North American and European studies showed that prevalence of pregestational diabetes mellitus 2.6 - 6.3/1000 of pregnancies, gestational diabetes mellitus 1.5 - 132/1000 pregnancies, these variations are partially due to differences in data collection, but also reflect considerable under-diagnosing of diabetes mellitus with pregnancy.

In USA, annually about 135,000 pregnancies are complicated by gestational diabetes mellitus and approximately 4% of all pregnancies are complicated by diabetes mellitus (ADA, 2000).

In Palestine this is the first study investigating diabetes mellitus with pregnancy.

In the Ministry of Health (MoH) and UNRWA Primary Health Care (PHC) centers, according to the available reports the number of newly registered pregnancies at the Southern area (area of study) of Gaza Province was 17931 from January 1999 to June 2000. Eighty-four were registered pregnant with diabetes mellitus, 24 (28.6%) of them were classified as pre gestational and 60 (71.4%) were gestational diabetes mellitus.

Safe motherhood as an essential right of all women to fulfill the goal of antenatal care is to achieve healthy pregnancy, safe delivery and emotionally satisfying outcome for both the mother and the baby (Hafez, 1998; Turmen,

1998). Special emphasis on the aim of reducing average risk or on people at high risk as a result of particular exposures (Alwan, 1997).

Women with diabetes mellitus with pregnancy present a broad array of challenging problems for the primary health care physicians and obstetricians. Special care with a team of health care professionals who know a great deal about diabetes and pregnancy can reduce the chance of health associated problems.

The aim of the study is to investigate diabetes mellitus status among registered pregnant women in primary health care centers in MoH and UNRWA at the Southern area of Gaza Province (Khan Younis and Rafah governerates).

1.1 Justification of the Study

Through different meetings with technical groups of professionals working in MoH and UNRWA fields (Appendix I), it was addressed that DM with pregnancy is more prevalent among pregnant women in Gaza Province than the reported cases. The high prevalence of cumulative risk factors are present enhancing occurrence of DM with pregnancy; obesity, high parity rate, age factor, positive family history for DM, high consanguinity rate, positive history of other non-communicable diseases. They stressed that the existing tools of screening are inadequate to detect the majority of women predicted to be DM with pregnancy.

years is an emerging growing problem.

At a personal level, I have experienced undetected and badly managed gestational diabetes, leading to bad obstetric history, where the first baby was lost due to premature delivery, the second baby was a miscarriage, the third was IUFD and the forth baby was a premature delivery exposed to cold injury, hypoglycemia, hyperbilirubenmia and be

According to my clinical experience as a practionar, the problem of diabetes mellitus with pregnancy in PHC at Shouhada' Khan Younis for many years is an emerging growing problem.

At a personal level, I have experienced undetected and badly managed gestational diabetes, leading to bad obstetric history, where the first baby was lost due to premature delivery, the second baby was a miscarriage, the third was IUFD and the forth baby was a premature delivery exposed to cold injury, hypoglycemia, hyperbilirubenmia and became disabled.

From this hard experience many questions were raised, why, how, what happen, to lose my dear babies? And what is the actual magnitude of the problem? How many women are exposed to this similar traumatic experience?

1.2 Focus of the Study

The study focused on diabetes mellitus status in pregnancy as it is an important public health issue; from different aspects:

a. Prevalence of reported diabetes mellitus (pregestational and gestational) with pregnancy among the local community.
b. Prevalence of different risk factors among pregnant women who were registered at PHC centers from January 1999 to June 2000 that enhancing diabetes mellitus in pregnancy.
c. Statistical relationship between these risk factors and the outcome of pregnancy.
d. Associated complications in terms of maternal, fetal and neonatal complications among the diabetics pregnant women compared to the non-diabetics.

e. The possible areas of intervention to control and prevent pregnancy problems associated with diabetes mellitus.

1.3 Objectives

General Objective

To identify diabetes mellitus status among registered pregnant women in primary health care centers in MoH and UNRWA in Khan Younis and Rafah governorates at the Southern of Gaza Province, from January 1999 through June 2000.

Specific Objectives

a. To estimate the prevalence of reported diabetes mellitus among newly registered pregnant women in primary health care centers in MoH and UNRWA in Khan Younis and Rafah governorate.
b. To find out the different risk factors associated and enhancing diabetes mellitus with pregnancy in the local community.
c. To study the health consequences affecting both mothers, fetus and neoborns as a result of diabetes mellitus with pregnancy.
d. To review the risk pregnancy assessment reported in maternal health records.
e. To asses the knowledge and satisfaction of pregnant women regarding diabetes mellitus and existing antenatal services.
f. To propose and suggest ideas for harmonization between health service providers on women well care services.

1.4 Research Questions

a. What is the estimated prevalence of diabetes mellitus among registered pregnant women in the study area and what is the prevalence of gestational diabetes mellitus (GDM) among the studied population?

b. Is there any differences between the two major health services providers (MoH and UNRWA) in the detection rate of GDM?

c. What is the prevalence of different risk factors at the local community that enhance appearance of DM with pregnancy?

d. What are the epidemiological and statistical features of existing risk factors that enhancing occurrence of GDM among pregnant women in the study population?

e. What are the implications of the result of this study in order to improve the preventive approach?

1.5 Hypothesis

Diabetes mellitus with pregnancy is under reported in the local community, although risk factors associated and enhance diabetes mellitus with pregnancy are highly prevalent.

1.6 Constrains and Limitations of the Study

The limitation of this study includes that, the data related to prevalence of diabetes mellitus is based on the reported data from maternal health records located at primary health care centers at MoH and UNRWA, with the variation in diagnostic methods between MoH & UNRWA.

1.7 Demography of the Gaza Province

The Gaza Province is a narrow zone of land, bordered on the south by Egypt, on the west by the Mediterranean Sea, and on the east and north by Israel. It is 46 kilometers long and 5-12 kilometers wide with an area of 370 square kilometers, which represents the Southern governorates of Palestine, 18% of the total area is occupied by Israeli settlements. Khan Younis and Rafah governorates consists of 118 square kilometers.

The Gaza Province is divided administratively into five governorates: North, Gaza, Mid zone, Khan Younis and Rafah. It is comprised of four cities, fourteen villages and eight refugees camps.

1.7.1 Education

Over the past 30 years, male literacy rate has doubled, the female rate has increased 8-fold quickly closing the gender gap, (MoH, 1998). According to PCBS and MoE in 1998 adult male literacy rate is 91.5 % and that for female is 77.0%.

1.7.2 Socioeconomic Status

The gross domestic product (GDP) in Gaza Province is estimated at 1,262$ per capita. Unemployment is high in Gaza Province as 19% of the population, taking in consideration the high dependency ratio. Thirty two percent of Gaza Province populations are living under the poverty line. Only 8-10 % of the formal workforce is female. When home-based work is taken into account, about 25% of the workforce consists of female (MoH, 1998). The findings of PCBS in 1997 reported a consanguineous marriage rate more than 47% in Gaza Province.

1.7.3 Health Services

Health services in Gaza Province are provided mainly by Ministry of Health of the Palestinian National Authority (PNA), the United Nations Relief and Works Agency for Palestine Refugees (UNRWA), non governmental organizations (NGOs) and the private sector.

Primary health care services, the MoH and UNRWA provide maternal and child health (MCH) services free of charge through 35 and 17 PHC centers respectively. They provide first line diagnostic and treatment services, as well as prevention, including comprehensive MCH services, school health, dental health and well-baby care services. Special medical care for non-communicable diseases such as diabetes mellitus, hypertension and cardio-vascular diseases that are fully integrated into medical care services.

In the Southern area there are two main central clinics (Shouhada' Khan younis and Shouhada' Rafah) and 10 peripheral PHCs all run by MoH (Appendix II). UNRWA runs 4 main health centers and one subcenter (Khan younis, Maa`n, Rafah, and Tal Sultan) and Shaboura' sub center.

Secondary health care services are provided mainly by the MoH through five hospitals including two general hospitals one in the Northern area and the other in the Southern area (Shifa and Khan Younis), pediatric hospital, ophthalmic hospital and psychiatric hospital. NGOs run four small hospitals that provide limited hospital services on a fee-for service basis.

Maternal Health Services

Assessment for risk factors and complications is an ongoing process all through the pregnancy period at PHC. In MoH women who are at high-risk pregnancy are referred from the peripheral health care centers to the high-risk

pregnancy clinics situated at the central governmental clinics (Appendix II & III). In UNRWA, women at high-risk pregnancy who visit the UNRWA health centers are referred to an obstetrician and other specialists according to fixed schedule.

The existing schedule for antenatal visits at all PHC centers in MoH and UNRWA, recommends monthly visits during first 24 weeks of gestation, after that women are recommended to attend every two weeks from 25-32 weeks of gestation and then to attend every week till the time of delivery.

Special efforts were exerted to encourage registration as early as possible after approval of pregnancy for early assessment of risk status and effective intervention, and when necessary. Two governmental central clinics are working in close cooperation with UNRWA. Including diagnostic and laboratory facilities. In addition, efforts were exerted to improve the system of referral, follow-up and feedback. This is to ensure safe delivery and healthy outcome of pregnancy. The outcome of pregnancy was known and registered in their maternal health records (MHRs) for all women, who received antenatal care at UNRWA while in MoH, it is registered for those received antenatal and postnatal services who have fee-free referral. At MoH MHRs are issued for every pregnancy at time of first visit of the antenatal clinic and is closed after the completion of pregnancy and kept for the general archive in PHC. New medical files are opened for new pregnancies (Appendix IV). The MHRs at UNRWA are kept for the next pregnancy, family planning and medical services as womens' health care records for future care (Appendix V).

Current Antenatal Care Procedures

Antenatal care is provided as an integral part of the comprehensive maternal health program according to defined standards and procedures with the ultimate objective of reducing pregnancy related morbidity and mortality.

MCH in MoH and UNRWA services are run by a team of midwives, physicians and obstetricians. During the first antenatal visit, a full history is taken including social, personal, medical factors, history of previous pregnancies and present pregnancy. History taking is done by the midwife and the general practitioner completes the medical history, carries the clinical examination, requests the needed laboratory test for urine analysis, Hb values and blood sugar while doing the final risk assessment and on each visit re-checks on the control of diabetes (blood tests). Pregnant women classified with diabetes during pregnancy need more frequent visits every two weeks and when it is needed.

MoH, Community Health Department for mothers' health, offered facilities for at risk pregnancy and pregnancies complicated with diabetes with a goal for early detection and prevention i.e. risk- based screening for fasting plasma glucose confirmed by post prandial test (2-hour postload glucose) is done at first antenatal visit and in others visit. Pregnant women at 24 - 28 weeks are routinely screened for fasting plasma glucose, regular follow up, regular antenatal visits, referral to hospital and even the hospitalization for diagnostic, treatment complication, the treatment including human insulin, insulin syringes and hospital delivery are all fee- free (MoH community health, 1999) (Appendix VI).

Community Health Department through maternal health services at MoH is utilizing well-defined guidelines and instructions for management of pregnant women with diabetes mellitus, including screening of those who are at risk, following up the pregnant with diabetes. The diabetics pregnant are referred to Nasser hospital for diabetologist for adequate control, investigations and evaluation. Maternal and Child health UNRWA services are implementing the technical instruction regarding screening at risk, universal screening of all pregnant women at 24-28 weeks for FPG, the pregnant with diabetes under close supervision of diabetologist and obstetrician.

Once GDM is detected, a thorough appraisal of the health condition of the pregnant women is carried out, a management plan is developed and implemented throughout pregnancy and during the post partum period by the Gynecologist and obstetrician. When insulin is prescribed soluble and isophane (NPH) are used together. The individualized dose is given in two fractionated doses.

UNRWA provides pregnant women at 32 weeks of gestation with the home-based records, which include information on the progress of pregnancy. A defined standard of post-natal care was adopted, the outcome of all pregnancies must be known, this helped to insure high coverage and proper targeting of mothers most in need of family planning (UNRWA, 1999).

In both programs the diabetic pregnancies are evaluated and followed up by ultrasound. According to schedule for monitoring the fetal age and

growth in order to detect early complications and calculate the expected date of delivery. The diabetic pregnancies are referred to hospital in the last month of pregnancy or earlier if needed (36 weeks). Hospital delivery is advised to be after or at least 38 weeks in the absence of obstetric problems and vaginal delivery is preferred (Appendix VII). High cooperation, where the pregnant diabetics at UNRWA PHC are refereed at 36 weeks of gestation to governmental high-risk central clinics according to standard protocol, to get benefit for free delivery services at the governmental hospital.

At UNRWA a quarterly report indicate the number of GDM cases and their breakdown into recovered and persistent cases. Once the case is reclassified, the women referred to the medical officer for further management and all pertinent data is transferred to the non communicable disease (NCD) patient file (UNRWA, 1997).

Newly Registered Records

Newly registered pregnant women at primary health care centers between the period of January-December 1999, January-June 2000 were registered as follows:

MoH: The total numbers of newly registered for antenatal care at all clinics in Gaza Province were 9614, 5500 in January-December 1999, January -June 2000 respectively. Out of which, the newly registered pregnancies at Southern area were 3,264 and 1,778 for the same two periods respectively (Community Health Department report, 1999, Jun 2000).

UNRWA: The total number of newly registered for antenatal care utilizing all clinics in Gaza Field were 24135, 13656 were in January-December 1999,

January-June 2000 respectively. Out of which the new registration in the Southern area were 8445, 4444 for the same two periods respectively (Field Gaza report, 1999, June 2000).

1.8 Demographic Trends

1.8.1 Population Size

Total mid year population size 1998 in Gaza Province is 1,039,580, and 50.4% are under 15 years old.

Khan Younis governorate: The total number of Khan Younis population is 213,888 people (20.5 % of the total Gaza Province population) (MoH, 1999).

Rafah governorate: The total number of Rafah population is 128,572 people (12.4 % of the total Gaza Province population) (MoH,1999).

1.8.2 Demographic Structure

The population of Palestine can be divided into refugees and non-refugees' inhabitants. The percentage of refugees in the Gaza Province is more than twice as high, where 65. 1% are refugees, non- refugees reach 34.5% and not stated 0.4%. About 50% of refugees are living in crowded camps, where living conditions are poor and people are more vulnerable to infectious diseases.

During the last six years, a lot of changes, progress and development took place in Gaza Province especially by the sincere efforts of all concerned. Which has its positive impact on the socioeconomic and sociodemographic changes among Gaza population.

1.8.3 Natural Increase

Population growth in Palestine was 4.5% in 1994 and gradually dropped down to 3.1% in 1998. According to the PCBS, the expected population size will be about 1.5 million by the year 2003.

1.8.4 Age and Sex Distribution

There is no significant difference between males and females regarding age distribution. Females under 15 years of age made up 45.8 % of the total female population while males in the same age group equaled 47.0% of the total for males. The distribution rate for males in the Gaza Province is higher in the "under 15 years" age group than in other groups, the percentage of males in Gaza in this age group is 50.7%, in comparison with 50.0 % of the females in Gaza, M : F. Ratio is 1 : 1 (MAS, 1998).

1.8.5 Population Density

Population density in the Gaza Province is very high, it is around 2871/km^2 (MoH, 1998).

1.8.6 Dependency Ratio

The PCBS calculates the dependency ratio as the number of persons below 15 and above 65 years per 1000 persons aged 15-65 years. For 1998 the dependency ratio for Palestine is 101.3.

1.8.7 Crude Birth Rate

Despite progressive decline over the years, the number of live births per 1000 population per year is still high in Palestine, compared to other countries. The crude birth rate declined from 40/1000 in 1996 to 34.5/1000 in 1998. The total number of reported births in the Gaza Province is 37,060 and the average crude birth rate is 35.6.

1.8.8 Place of Delivery and Attendance

The vast majority of deliveries take place at hospitals, governmental hospitals take the biggest share 42.3% which may be attributed to the presence of better facilities. According to Khan Younis Hospital data from obstetric department activity was as follow: in 1999, the number of deliveries were 6085, among which 88 twins, 94 premature deliveries and 89 fetal deaths. The total number of obstetric operation was 864 including 636 caesarian section (CS) and 620 other operations. The admission days were 13793, the average length of stay was 2 days and the occupancy bed ratio was 74%. From January-June 2000, the number of deliveries were 3134, among which 58 twins, 39 premature deliveries and 44 fetal deaths. The total number of obstetric operations was 485, which includes 337 CS and 361 other operation. The admission days were 7240, the average length of stay was 2 days and the occupancy bed ratio was 68.7%. At the study period, the CS was 10.7% of all deliveries while it was 72.1% of all obstetric operations.

1.8.9 Fertility

The total fertility rate (average number of children born to women (15-49) in the Gaza Province is 5.54. The total fertility rate has been decreasing progressively over the period 1994 - 1998. This decline has taken place in all age groups. It worth to mention that in 1998 the fertility peak has shifted from the 20-24 age group to the 25-29 age group (MoH, 1998).

1.8.10 Average Size of Family in Gaza Province

The average family size was 7.8 persons, data reveal that the average family size in the camps exceeds the other localities, where it comes to 8 in camps population, and 6.7 persons in the cities (MAS, 1998).

1.8.11 Life Expectancy

The average life expectancy at birth of the Palestinian population was 69.2 in 1993 and is at present 71.7 years. The life expectancy for women (73.3) is higher than that for men (70.1) (MoH, 1998).

1.8.12 Mortality

Crude death rate:

The overall death rate in Gaza Province is 3.5/1000 in 1998.

Infant mortality rate:

Infant mortality rate is reported in Gaza Province to be 22.7/1000. Out of which the early neonatal deaths were 14.8%, late neonatal deaths were 35.2% and 50.0% for post neonatal (MoH, 1998).

Maternal mortality rate:

A recent studies for maternal mortality shows the maternal mortality rate in Gaza Province 42 per 100,000 (Palestinian MoH, 1997).

PCBS (1997) data for the year 1995 show that maternal mortality rate (per 100,000 live births) in the WB and GS was highest for the 50 -54 age group, amounting to 140. This was followed by the 15-19 age group with a rate of 93 and proceeded by the 45-49 age group with a rate of 84. The lowest maternal mortality rate was 60 for the 25-29 age group, followed by 67 for the 30-34 age group and increasing to 78 for the 40-44 age group. These rates indicate that there is a direct correlation between maternal mortality rates and woman's age; young women (19 years and under) and older women (45 years and over) have higher mortality rates (MAS, 1998).

The confirmed maternal deaths were (14) women in 1997 (37.3 per 100,000) in the Gaza Province compare with (29 per 100,000) in 1996.

Chapter 2
Literature Review

Chapter 2

Literature Review

Diabetes mellitus in pregnancy is one of the most observed public health problems in the world today. Developing countries are the most affected. In Gaza Province maternal and child health care services comprise an important component of PHC for management of diabetes in pregnancy. "Success through simplicity" proved to be an opportunity to practice preventive medicine by ensuring that diabetes is detected and managed appropriately in pregnant women thereby ensuring a good outcome for mother and child. With good organization, the availability of well-trained staff, the necessary medication and monitoring equipment, the management of the majority of pregnant diabetic women is straightforward, extremely satisfying and rewarding.

2.1 Definition and Description of Diabetes Mellitus

American Diabetes Association (ADA), 1997 defined diabetes mellitus as " A group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of various organs, especially the eyes, kidneys, nerves, heart and blood vessels ".

2.2 Classification of Diabetes Mellitus

There are basically four major forms of diabetes mellitus as classified by ADA and WHO, 1997; CDC, 1998.

2.2.1 Type 1 Diabetes " Young Adult "

It is characterized by beta cell destruction of the pancreas, usually leading to absolute insulin deficiency. Type 1 diabetes account for 5 -10% of all diagnosed cases of diabetes. It has two forms:

- Immune-Mediated Diabetes Mellitus, which results from a cellular, mediated autoimmune destruction of the beta cells of the pancreas.
- Idiopathic Diabetes Mellitus which refers to forms of the disease that have unknown etiologies.

2.2.2 Type 2 "Adult Onset Diabetes"

It is a complex of diseases due to insulin resistance that usually have relative rather than absolute insulin deficiency. The etiology ranges from predominant insulin resistance with relative insulin deficiency to predominant insulin deficiency with some insulin resistance. Type 2 diabetes account for 90-95% of all diagnosed cases of diabetes. It is often associated with a strong genetic predisposition. The risk of developing Type 2 increases with age, obesity, and lack of physical activity. Obesity itself causes some degree of insulin resistance.

2.2.3 Impaired Glucose Tolerance "Homeostasis"

It is an intermediate metabolic stage between normal glucose homeostasis and diabetes, it is a risk factor for diabetes and cardiovascular disease. It is characterized by impaired glucose tolerance plasma glucose higher than normal, and less than the diagnostic values of 110-125 mg/dL. Following administration of a glucose load of 75 grams. It is also characterized

by impaired fasting glucose, where fasting plasma glucose higher than normal, and less than diagnostic. It is estimated that 13.4 million persons, 7.0% of the American population, have impaired fasting glucose.

2.2.4 Gestational Diabetes Mellitus

It is defined as glucose intolerance in pregnancy according to CDC, 1998 National Diabetes Fact Sheet report with onset or first recognized during pregnancy. It develops in 2 -5% of all pregnancies. It is more frequent between Africans, Americans of different ethnic roots, and persons with positive family history of diabetes. The same report stated that 40% of women with previous history of GDM developed diabetes in the future (CDC, 1998). The rate is different between different communities and areas according to racial, environmental and tools of diagnosis, with special emphasis on obesity as a higher risk factor. ADA, 1997 revealed that many patients with GDM will not develop diabetes later in life and others are diagnosed many years post partum as having Type 1 diabetes, Type 2 diabetes, IFG, or IGT.

2.2.5 Other Specific Types

Diabetes caused by other identifiable etiologies that constitute 1-2% of all diagnosed diabetes. Genetic defects can affect the function of beta cell of the pancreas leading to MODY 1, 2 & 3, other genetic defects can affects the insulin action. Pancreatic exocrine diseases like cancer of the pancreas, cystic fibrosis, pancreatitis, endocrinopathies like cushing's, drug or chemical induced like steroids therapy, Infection condition like rubella, uncommon forms of

immune-related diabetes and other genetic syndromes are important causes of diabetes.

In Saudi Arabia's female population, El Hazmi, et al, 1990 reported that the prevalence of Type 1, Type 2, IGT was 0.30%, 4.53% and 0.72% respectively and increased by age. Abu Mousa, 1998 conducted a study in Gaza-Palestine on magnitude of diabetes mellitus, he found that 17.3%, 76.2%, 4.7%, 1.8% were Type 1, Type 2, gestational diabetes and other types respectively of the sample population.

2.3 Pathogenesis of Diabetes Mellitus

Several pathogenic processes are involved in the recent development in the understanding of diabetes, these ranges from autoimmune destruction of the β-cells of the pancreas with consequent insulin deficiency to abnormalities that result in resistance to insulin action. The basis of the abnormalities in carbohydrate, fat, and protein metabolism in diabetes is a deficient action of insulin on target tissues. Deficient insulin action results from inadequate insulin secretion and/or diminished tissue responses to insulin at one or more points in the complex pathways of hormone action. Impairment of insulin secretion and defects in insulin action frequently coexist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycemia (ADA, 1997). Symptoms of marked hyperglycemia include polyuria, polydipsia, weight loss, sometimes with polyphagia, and blurred vision. Impairment of growth and susceptibility to certain infections may also accompany chronic hyperglycemia. Acute, life-threatening consequences of

diabetes are hyperglycemia with ketoacidosis or the nonketotic hyperosmolar syndrome (ADA, 1997).

2.4 Diabetes Mellitus with Pregnancy

2.4.1 Historical Review of Diabetes Mellitus in Pregnancy

Until late nineteenth century, pregnancy among diabetic women was virtually unknown, owing to the severe effects of unchecked hyperglycemia and functional starvation associated with insulin deficiency. In 1882, Duncan reviewed the first review of diabetic pregnancy and reported 22 pregnancies in 15 women aged 21 to 38 years. Only 10 children survived, and only six of the patients were alive one year after delivery. Williams (1909) reviewed 66 cases of diabetic pregnancy ended by 50% maternal mortality and 59% perinatal survival. Joslin (1916) reported seven pregnant women with severe insulin-dependent diabetes, five of whom died of diabetic complications. Later descriptions of diabetic pregnancies by Craigin and Ryder (1916), DeLee (1920), and Williams (1925) reported an overall 30% incidence of abortion and premature labour, stillbirth in over half, infant deaths in one-in-seven (Moore, 1994).

2.4.2 Metabolic Changes in Normal Pregnancy and Diabetic Pregnancy

In normal women, pregnancy is accompanied by remarkable changes in metabolic homeostasis to favor fetal growth, maturation, and survival. Normal pregnancy is characterized by increasing insulin resistance, which is probably due to human placental lactogen, a growth-

hormone-like protein secreted by the placenta. The body must therefore produce more insulin as much as 30% or more to do the required job. Under normal circumstances, the pancreas is easily able to keep up. Some women, who are desired to get pregnant later in life, however, their bodies cannot meet the increased requirements of pregnancy for insulin then they develop diabetes during pregnancy, which is called gestational diabetes. This common disorder occurs in 1-3% of all pregnancies. Although pregnant women develop compensatory hyperinsulinemia, postprandial glucose levels increase significantly throughout pregnancy (Herman, 1991; Herman and Perry, 1997). During the later half of pregnancy, carbohydrate metabolism is stressed by rising levels of human chorionic somatomamotropin (hCS) from the placenta which is diabetogenic effect. Other protein and steroid hormones synthesized by the placenta cause severe stress on maternal carbohydrate metabolism. Plasma levels of prolactin of decidual and pituitary origin, cortisol and glucagon are also higher in late pregnancy. The sum of these hormonal changes results in modest insulin resistance, mobilization of hepatic stores of glycogen and an increase in hepatic glucose production. Thus the physiologic effect is to ensure a constant supply of glucose, lipids and amino acid to the fetus (Hollingsworth, 1994). During late pregnancy, fasting glucose levels fall because of increased glucose consumption by the placenta and the fetus. Women with GDM are usually treated by diet and are monitored more carefully toward the end of pregnancy. After delivery, blood-sugar levels usually return to normal, but these women are at increased risk of developing diabetes later in life (Herman, 1991; Herman and Perry, 1997).

2.4.3 Classification of Diabetes in Pregnancy

Women known to be diabetic Type 1 or Type 2 when they get pregnant will be classified as pregestational diabetics.

Healthy women, when they get pregnant and who are diagnosed diabetic during the pregnancy classified as GDM. Approximately 4% of all pregnancies are complicated by GDM, which represents nearly 90% of all pregnancies complicated by diabetes (ADA 1997; 2000). In both categories if the diabetes is untreated appropriately it can significantly increase the risk of maternal and fetal/neonatal morbidity and mortality. Prepregnancy care incorporated into the plan of management for women with pre-existing diabetes can result in improving pregnancy outcomes (Jovanovic-Peterson, 1994).

2.4.4 Epidemiological Picture of Diabetes in Pregnancy

2.4.4.1 Global Epidemiology of Diabetes in Pregnancy

In U.S.A, each year approximately 10,000 infants are born to women with pregestational diabetes, and 60,000 - 90,000 infants are born to women with gestational diabetes (Herman, 1991). About one in 100 women of childbearing age has diabetes before pregnancy, which referred as pre-existing diabetes. Another 2-3% develop diabetes for the first time during pregnancy, this is called gestational diabetes. In both forms, it is crucial to control blood sugar levels to reduce risks to the pregnant woman and her fetus (Siccardi, 1997).

2.4.4.2 Prevalence of Diabetes in Pregnancy

Sufficient worldwide data on the prevalence of various types of diabetes in pregnancy are not available. From North American and European studies the following prevalence can be deduced

Type 1 : 2.1 - 5.0 per 1000 pregnancies

Type 2 : 0.53 - 1.25 per 1000 pregnancies

GDM : 1.5 - 132 per 1000 pregnancies

These variations are partially due to differences in data collection, but also reflect considerable under-diagnosing of Type 2 diabetes and GDM in pregnant women. Furthermore, it is evident that both conditions show considerable geographic, ethnic and racial variation. Approximately 4% of all pregnancies in the USA resulting in 135,000 cases are complicated by GDM annually. The prevalence varies worldwide and among different racial and ethnic groups within a country. The variability is partially due to the different criteria and screening regimens used (ADA, 1997; 2000).

In a study conducted at the Aga Khan Maternity Home, Karachi from January 1990 to December 1992, the collective prevalence of GDM was found to be 3.45% (Jawad and Irshaduddin, 1996).

In Melbourne (Australia), there was an increase in the prevalence of Type 1 diabetes from 0.15 - 0.44% as well as Type 2 diabetes from 0.03 - 0.11%. There was a progressive increase in the proportion of women of Type 2 who had GDM (8.3 - 39.1%), but the trend was not statistically significant. Women with Type 2 diabetes were more likely (31.3%) to have had

gestational diabetes in the past than women with Type 1 diabetes (3.9%) (Beischer et al, 1996). In Dublin, universal screening detected the prevalence of GDM of 2.7%, significantly more than the 1.45% detected in the risk factor group (Griffin et al, 1999).

The incidence of diabetes mellitus during pregnancy in UNRWA Agency-wide was established at 0.84%. The expected incidence is 3.0% which indicate low detection rate, 52% of all cases were GDM and 48% of women with pre-existing diabetes were diagnosed during pregnancy (UNRWA, 1999).

2.4.5 Prediction and Detection of Diabetes Mellitus Associated Pregnancy

Risk factors are well known to be associated and enhancing occurrence of DM with pregnancy and occurrence of GDM in specific. According to Alwan, 1994 ***risk factors*** are categorized as follow:

1- <u>Historical Risk Factors</u>

- Strong family history in first-class relative
- Obesity.
- Previous history of stillbirth.
- Previous history of repeated abortions.
- Previous history of premature delivery.
- Previous history of polyhydramnios associated pregnancy.
- Previous history of giving birth to a big baby.
- Previous history of GDM.
- Hyperglycemia.

2- Current Risk Factors

- Glycosuria.
- Macrosomia in current pregnancy.
- Polyhydramnios in current pregnancy.

There are no problems among pregnant with pre-existing diabetes but the problem is mainly among pregnant who suffers from undetected different risk factors that enhance the occurrence of diabetes mellitus. Approximately 2 - 3% of all women who do not begin a pregnancy with diabetes become diabetic during the pregnancy, usually at the midpoint of pregnancy when insulin resistance becomes most noticeable, which then is termed GDM. Women who are prone particularly to this complication, are those who are obese, over the age of 30, have a history of delivering large babies, congenital anomalies in previous pregnancies, unexplained fetal, natal or neonatal loss or a family history of diabetes one close relative or two distant ones (Pillitteri, 1995). Risk assessment for GDM should be undertaken at the first antenatal visit especially for women with clinical characteristics consistent with a high risk of GDM like marked obesity, previous personal history of GDM, glycosuria, or a strong family history of diabetes (ADA, 2000). In Dublin, Griffen et al, 1999 reported that subjects with GDM in both groups (risk factor GDM and universal factor GDM) were significantly older and heavier than those without GDM. In France, Vambergue et al, 1992 reported that women with MGH were older than the controls 28.8 vs. 27.0; P-value < 0.05 and had a higher body mass index 24.8 vs. 23.0; P-value < 0.01.

Jawad and Irshaduddin, 1996 revealed that age range of the gestational diabetic women presented almost half those between the age group between 25.1 - 30 years old, a positive family history in first-degree relatives was present in nearly half the subjects and gravidity gave a past history of GDM 10.4%.

Catalano, et al. (1999) conducted a longitudinal study of changes in glucose metabolism during pregnancy in obese women with normal glucose tolerance and women with gestational diabetes mellitus. They showed a decrease in maternal glucose insulin sensitivity with an advancing gestation and concluded improve in the understanding of carbohydrate metabolism in obese women, which may provide a basis for therapeutic strategies to prevent obstetric complication, for which these women are significantly subjected later in life.

Parity order has been investigated to find out whether it affects diabetes status in pregnancy, for example Abdulla et al ,(1995) suggested an association between DM in pregnancy and increasing parity. The study revealed that 8.6% of the women diagnosed during pregnancy had high parity index 6.5. Sixty three percent reported positive family history in first-degree relatives, mean body mass index (BMI) was 31.8 kg/m^2 in women. Among the diabetic women 57.7% were obese (BMI > 30 kg/m^2) and 30.2% were overweight (BMI 25 - 30 kg/m^2). They concluded that frequent association with obesity suggests a major risk factor. The strong familial aggregation paves the way for future research for defined genetic trait with Type 2 diabetes in the Arab population.

In Auckland, cohort study carried over a 12-year period, subjects with Type 2 DM were significantly older, more obese and had higher parity than subjects with Type 1 DM, and presented later to be diabetics. It was concluded that factors other than glycemic control, such as maternal obesity are palmed to contribute to the high rates of fetal loss (Cundy et al, 2000). In other studies the parity order is not an obstetric risk factor for diabetes mellitus in pregnancy.

2.4.6 Adverse Effects of Diabetes Mellitus on Pregnancy

Hollinsgrowth, 1994; Moore, 1994; Hod, et al 1995; Hudell, 1999 and ADA, 2000 described medical and obstetric complications of diabetic pregnancies in Type 1, Type 2 and GDM as follows :

2.4.6.1 Maternal Complication

Metabolic complications (Hypoglycemia, Hyperglycemia ketoacidosis), emotional stress, worsening of chronic complications (retinopathy, nephropathy, neuropathy, cardiac disease), delivery complications "an increase rate of caesarian delivery", non-cooperative patients and physician failure, obstetric complications are particularly relevant to the diabetic pregnancy. The obstetric complications are:

1. Hydramnios: Poor diabetic control is associated with increase amniotic fluid volume. The frequency in pregnancy from 1 - 2% normal subjects and from 5 - 18% among women with diabetes. Insufficient glycaemic control may play a role in amniotic fluid excess since there is a higher incidence of macrosomia and neonatal hypoglycaemia in babies born for women with hydramnios.
2. Infections: urinary tract infections are associated with poorer glycaemic control and an increased incidence of premature labour.

3. Pregnancy-induced hypertension, Transient hypertension and preeclampsia.

Pregnancy may be associated with exacerbation of diabetic eye disease, especially in women with unrecognized or untreated proliferate diabetic retinopathy. Diabetic women with nephropathy and hypertension are at greater risk for preeclampsia and fetal growth retardation than women without nephropathy. Death has been reported among pregnant women with diabetes and coronary artery disease.

When glucose regulation is poor, the women are more prone to pregnancy - induced hypertension than other women (Pillitteri, 1995). Hypertension disorders were more commonly seen in pregnancies complicated by diabetes than in non-diabetics. Their increased incidence is thought to be related to underlying diabetic vasculopathy (Haire-Joshu, 1992).

A blood pressure of more than 140/90 suggests pregnancy-induced hypertension, if a woman knows her prepregnancy blood pressure, a systolic elevation of 30 mmhg or a diastolic elevation of 15 mmhg over the prepregnancy level can also used to screen for prepregnancy-induced hypertension (Pillitteri, 1995).

Moor, 1994 and Hollinsgrowth, 1994 reported that incidence of pregnancy-induced hypertension is approximately twice as common in women with diabetes as in the non-diabetic population and the main morbidities for the mothers are hospitalization and early delivery. In 1997, El Raoof concluded that diabetes mellitus does not have complications on the perinatal outcomes only but also on the pregnant mothers and these maternal complications were

found as follow: Pregnancy induced hypertension were (20.3%), severe polyhydramnios (26.26%), pre-term delivery (23.07%), diabetic ketoacidosis (3.1%) and antipartum hemorrhage were (4.6%). The reported incidence of CS was about 44.17%.

For many years, cesarean birth was routinely performed in pregnant diabetic women at approximately 37 weeks of gestation. Cesarean birth was chosen because it is difficult to induce vaginal labor this early in pregnancy as the cervix is not responsive to labour contractions. Furthermore, babies of diabetic women may be large making vaginal delivery difficult, where the risk of trauma during birth is increased. Moreover, a fetus suffering placental dysfunction or insufficiency, which may occur with maternal diabetes, will not do well in labour and may die (Pillitteri, 1995; Herman and Perry, 1997).

One of the more common problems of the pregnancy complicated by diabetes is increased rate of CS, early studies indicated that 40 - 60% rate of CS in women with pregestational diabetes as compared with a norm of 20%. At the present time more emphasis on achieving a vaginal delivery, especially in women's with shorter duration and with minimal problems during pregnancy by improvement the monitoring and assessment of the fetal status (Haire-Joshu, 1992).

Griffen,1999 estimated the outcome and the risk factor in the development of current risk factors. Where in the risk factor-GDM group was associated with a very low rate of spontaneous vaginal delivery and high rate of

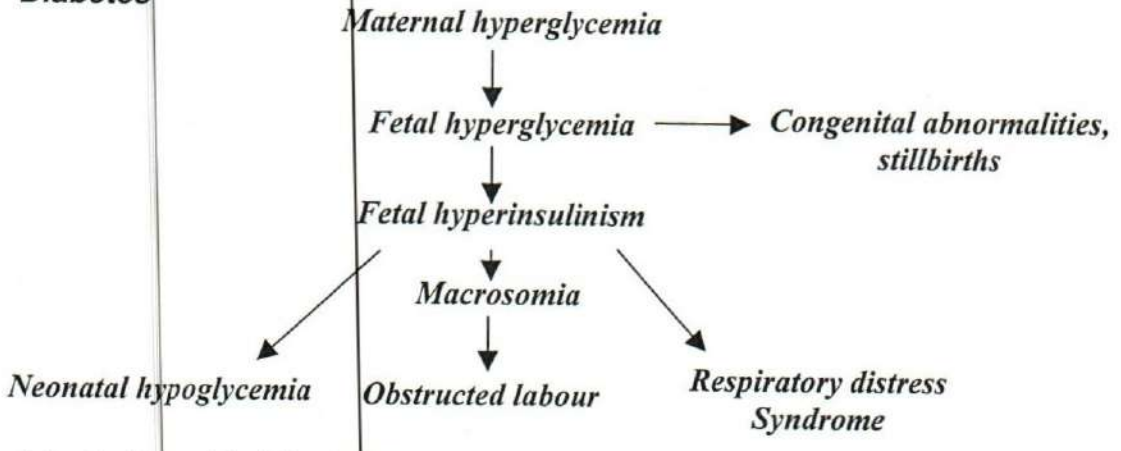
macrosomia, prematurity and CS, where the presence or absence of a risk factor in the universal GDM group did not influence outcome.

The American diabetes association in year 2000 reported "GDM is not an indication for cesarean delivery or for delivery before 38 weeks completed gestation, because prolongation of gestation past 38 weeks increases the risk of fetal macrosomia without reducing ceasarean rates, so that delivery during the 38th week is recommended unless obstetric considerations dictate otherwise".

2.4.6.2 Fetal Complication

The expected fetal complications were described as follow: spontaneous abortion, congenital anomalies, macrosomia (fetal growth disturbances), still births (IUFD), asphyxia and perinatal mortality, neonatal complications, prematurity (Pre-term birth) and respiratory distress syndrome, postnatal hematologic and metabolic disturbance.

Figure Consequences to the Fetus of the Mother with Uncontrolled Diabetes



Adapted from Huddle, 1999

2.4.6.3 Incidence of Diabetes in the Offspring

The offspring of women with GDM have increased risk of macrosomia at birth and obesity in adolescence, also they appear to be at greater risk of developing glucose intolerance.

The first trimester of pregnancy is the most critical time for fetal development. If the woman's serum glucose level can be kept from becoming hyperglycemic during this time, the chances of congenital anomaly are greatly decreased (Pillitteri, 1995). Because glucose crosses the placenta by facilitated diffusion, maternal hyperglycemia produces fetal hyperglycemia. Fetal hyperglycemia occurs in response to this abnormal metabolic environment. Hyperinsulinemia combined with hyperglycemia, leads to excessive fetal growth. It may also contribute to poor fetal growth and stillbirth " fetal death ", delayed fetal pulmonary maturation, and neonatal hypoglycemia (Herman, 1991; hollingsworth, 1992; Herman and Perry, 1997).

So, preconception counseling and diabetes control during pregnancy are important since congenital malformations in pregnancy occur as a complication of DM. Congenital malformation is linked to disturbances in maternal metabolism during the period of embryogenesis, and organogenesis which is completed by the sixth or seventh week of gestation (Berkow and Fletcher, 1992).

A prospective study was conducted in Qatif, Saudi Arabia on diabetic mothers and their offspring to determine the perinatal morbidity and mortality on

offspring of diabetic mothers. Out of 11677 deliveries at hospital, 1.14% infant were delivered by diabetic mothers, 4.5% were stillbirths and 95.5 % were live births, 57.9%, 41.3% and 0.8% were large, appropriate and small for gestational age respectively. Hypoglycemia occurred in 38.6% of the 127 infants. Other associated problems were bacterial infections, congenital anomalies, birth trauma, pre-term delivery, respiratory distress, polycythaemia and anemia. Only 39.1% of the mothers received appropriate treatment for their diabetes during pregnancy. They also concluded that poor maternal diabetic control resulted in high perinatal morbidity and mortality in the offspring. In order to improve the outcome in offspring of diabetic mothers in Qatif and probably Saudi Arabia as a whole, health education and improved care of the diabetic mothers during pregnancy are urgently needed (Al Dabbous et al, 1997).

A study conducted by Jawad and Irshaduddin in 1996, reported only four losses in the three calendar years, one premature delivery at 24 weeks gestation followed by neonatal death, one abortion at 12 weeks, one intrauterine death at 32 weeks, the cause of which could not be determined and one fresh stillbirth. This gives a figure of 2.08 %. They concluded that early screening of pregnant women gives an early diagnosis of GDM, good management, close monitoring and patient compliance give a satisfactory outcome for an infant of normal weight, low incidence of perinatal losses and unnatural at-term delivery.

The outcome of diabetic pregnancy has greatly improved over the last 20 years. One aim of the St Vincent Declaration (1989) was " to achieve outcomes in diabetic pregnancies similar to that in the non-diabetic population over the following 5 years "

Brydon et al, 1998 reported that congenital malformations occurred in offspring of 3/74 women with insulin-dependent diabetes (IDDM) (40/ 1000), 4/26 with non-insulin-dependent diabetes mellitus (NIDDM) (154/ 1000) and 2/107 with gestational diabetes mellitus (GDM) (19/1000). The overall prevalence of congenital malformation was 43.4/ 1000 births which is 2.7 times greater than that observed in the background non-diabetic population (16.2/ 1000) over the same time ($p < 0.01$). They also stated that during the previous ten years the rate of congenital malformations in diabetic population was 3.7 times greater than that observed in the background population ($p < 0.01$) so the aim of the St Vincent Declaration has not been achieved as 3 -fold excess still exist in diabetic pregnancies.

Haire-Joshu , (1992) concluded that blood glucose control is important in preventing congenital anomalies but that euglycemia isn't absolutely necessary to prevent the problem, and if the presenting glycated hemoglobin is within the normal range or 1 -1.5 units above the top of this range, risk factor of congenital malformation appears to be similar to the rate seen in pregnancy which is not complicated by diabetes.

The National Fact Sheet report stated that between 3- 5% of pregnancies among women with diabetes result in death of the newborn compared to 1.5% of pregnancies among women who do not have diabetes (CDC, 1998).

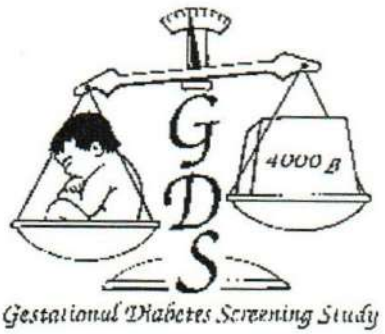
2.4.7 Tools of Detection and Diagnosis for Diabetes Mellitus

American Diabetic Association (1997; 2000) and other diabetic working groups defined the tools for detection and diagnosis as follow:

2.4.7.1 Tools of Detection of GDM

a) Universal screening:

All pregnant women at 24 - 28 weeks to be screened for fasting plasma glucose (FPG), if FPG < 105 mg/dL then GDM is unlikely, if FPG ≥ 126 the GDM is diagnosed. Women with FPG 105 - 125 are subjected for 100 gm OGTT, which is still worldwide used and it is the only tool implemented in the local community. It is recommended that "all pregnant women be tested between 24th and 28th weeks of all pregnancies".



b) Risk factors-based screening tools:

The traditional method of screening for GDM is to assess risk factors: age, pregnancy weight, family history of diabetes in a first-degree relative, previous large baby and previous perinatal loss. Screening based solely on risk factors will only identify approximately 50% of women with GDM. This tool is implemented partially in UNRWA Gaza field beside the universal FPG (UNRWA, 1999).

Glycosuria is a common finding in pregnancy due to increased glomerular filtration and is therefore unreliable as a diagnostic finding.

c) Glucose Challenge Test (GCT):

ADA, 2000 recommended that " all pregnant women, who have not been identified with glucose intolerance earlier in pregnancy, be screened with a 50-g

1-hour GCT between 24 and 28 weeks of pregnancy". Such test can be performed at anytime of the day with disregard to previous meal ingestion. A value equal to or above 140mg/dL should be used as the threshold level and indicates the need for a 100-g 3-hour OGTT. In order to perform OGTT, women should be fasting, fasting blood glucose level is obtained then 100-g of glucose is admitted orally. A blood sample is taken every hour for 3 hours. The patient is advised to sit quietly during the test to minimize the impact of exercise on glucose levels. If one abnormal value is seen during the 100-g 3-hour OGTT, it is recommended that the test be repeated approximately one month later. There is growing evidence that one abnormal value is sufficient to make an impact on the health of the fetus and is now the criterion used by most clinicians to initiate treatment. Although in another study conducted by Siccardi, 1997 on 106 women with one abnormal value on the OGTT, 34% were diagnosed with GDM when the test was repeated one month later. This emphasis the importance of repeated testing when only one abnormal value is found.

d) <u>The Two-Step Approach:</u>

This approach is highly recommended by American Diabetes Association and other diabetic working groups, as an initial screening test by measuring plasma or serum glucose concentration one hour after a 50-g oral glucose load (Glucose Challenge Test, GCT) and to perform a diagnostic OGTT on the subset of women exceeding glucose threshold value (140 mg/100 ml). By employing this approach approximately 80% of women with GDM could be identified, and a yield is farther increased to 90% by using a cutoff <130 mg/dl.

Hong et al, 1989 conducted a study on first antenatal visit glucose screening, the conclusion was that universal screening for gestational diabetes at first antenatal visit detected a significant number of cases that would have been missed if current screening recommendations were followed. The recommendation was to perform universal glucose screening for gestational diabetes at first antenatal visit. Minor increases in cost associated with universal screening may be offset by potential savings from more timely initiation of appropriate antipartum management.

Zoller et al, (1988) concluded that universal screening of pregnant women for GDM was found to be simple and cost effective, no difference between women with risk factors and those without in rate of abnormal glucose tolerance. They recommended the screening of all pregnant women because a history of risk factors for diabetes is an insensitive predictor of GDM.

The Landon survey (1990) indicated that 90% of perinatologist screen all pregnant women at 24 - 28 weeks, but only 75 % of board-certified obstetricians do so. The reminder screen only women with 'risk factor' for GDM.

Griffin et al, 1999 compared universal and risk factor-based screening for gestational diabetes mellitus for detection rates, gestation at diagnosis and outcome. They stated that, in the universal group 333 (26%) of the subjects screened had positive GCT. Out of them 311 patients (94%) had an OGTT where 32 cases of GDM were identified. Ninety-two patients considered as high risk had a repeat GCT at 32 weeks, of whom 33 pregnant women (36%) were positive, 3 cases of GDM was thus identified. In total a prevalence of 2.7% in universal group, 1.45% of risk factor group, which was significant. They

concluded that, universal screening was superior to risk factor based screening, early identification in this study reduced the need for intervention in delivery and reduced the need for neonatal care facilities and the early intervention in pregnancies complicated by GDM which universal screening allowed was associated with improved maternal and fetal outcome.

A study conducted on gestational diabetes mellitus diagnosed during early pregnancy to compare pregnancy complications, obstetric outcomes and perinatal outcomes between women with early-onset and late-onset gestational diabetes mellitus. Screening with 50-g oral glucose challenge was conducted among 3986 pregnant women at the time of their first antenatal visit. Women without abnormal results underwent another test at 24 - 28 weeks gestation. They concluded that, women with an early diagnosis of gestational diabetes represent a high-risk subgroup, that early intervention to improve glucose homeostasis avoided some complications commonly related to pregestational diabetes. Also they suggest that this subgroup of women should be identified and further studies are needed to clarify whether screening should be done among all pregnant women or only among those with high risk of development of diabetes during pregnancy (Bartha, et al. 2000).

Screening of pregnant for diabetes among Palestinian refugees women who are attending UNRWA primary care centers is practiced for more than 10 years. Screening tools for detection of pregnant with GDM is fasting plasma glucose (FPG) test. FPG test is performed for all pregnant women at 24 -28 weeks of gestation, those with FPS values ≥ 105 mg/100ml found to have controversial plasma glucose values are subjected to two hours 100 gm

oral glucose tolerance test (OGTT). In addition, urine analysis for glucose and proteins is performed for each pregnant woman at every visit to the antenatal clinic. However, this approach is more likely to yield very low prevalence of gestational diabetes mellitus among the pregnant registered at UNRWA- PHC centers especially at Gaza Province, which is around 0.4%. The pattern of life in Gaza Province especially the eating habits could be a major contributing factor leads to the high prevalence of GDM according to FPG screening test results. To correct the situation and detect women with GDM among the registered pregnant at PHC centers at UNRWA-Gaza, OGTT was recommended to be performed to the pregnant with one or more of risk factors associated with GDM regardless to FPG values. After one year of the last recommendation, which is restricted to Gaza field the prevalence still less than the expectation (UNRWA, 1999).

The most cost-benefit outcome of screening all pregnant women for gestational diabetes would be a decrease in perinatal mortality rates. The cost of preventing cesarean section, death from macrosomia, and certain other outcomes would be so great that a decision to screen should be based on trying to prevent these events (Everet, 1989).

2.4.7.2 Tools of Diagnosis

Blood glucose classification readings:

1) **FPG is interpreted as follows:**

- If FPG is less than 105mg/dl then GDM is unlikely.
- If FPG ≥ 126mg/dl then GDM is diagnosed.

- If FPG is between 105mg/dl and 125mg/dl then a 100g OGTT should be performed.

2) **GCT (1 hour a 50g GCT) interpreted as follows:**

50 grams of anhydrous glucose in 200ml water will be given to the lady over a period of 5 minutes, irrespective of the fasting status of the pregnant lady and irrespective of the time of the day.

- GCT is less than 130mg/dl then GDM is unlikely.
- If GCT ≥130mg/dl then a 100 g OGTT should be performed.

Screening and Diagnostic Criteria for GDM (100-gram, 3-Hour Glucose Tolerance Test OGTT)

At least two of the following values should be met or exceeded:

Plasma Glucose Time of test	50-g screening test	100-g diagnostic test
Fasting	____	105mg/dl (5.8mmol/L)
1 hour	140 mg/dL	190mg/dl (10.6mmol/L)
2 hours	____	165mg/dl (9.2mmol/L)
3 hours	____	145mg/dl

Adapted from American Diabetes Association (ADA), 1997 and 2000

Atilano, 1999 concluded an elevation in glucose loading test was associated with predictive for GDM but not high, omission of 3 - hour glucose tolerance test measurement resulted in failure to diagnose 13% of GDM cases.

A fasting plasma glucose ≥ 105-mg/dl was highly predictive of an abnormal glucose tolerance test in patient with elevated glucose loading test value. Pendergrass et al, 1995 reported that the diagnosis of GDM importance for two reasons: First, it will identify patients in whom needed glycemic control which will prevent perinatal complications, second it will identify patients who may benefit from early therapeutic intervention to prevent the development of Type 2 and associated complications later in life.

2.4.8 Pregnancy Management of Overt Diabetics

In practice, early detection, effective management, education and metabolic control, as well as the correction or reduction of major risk factors are the clinical management, which include the following objectives (Jovanovic-Peterson, 1994; Moor, 1994; Crombleholme, 1999; ADA, 2000):

- Achieve normoglycaemia.
- Prevent development of complications.
- Stabilize existing complications.
- Maintain pregnancy to term (minimum 38 weeks).

2.4.8.1 Prepregnancy Counseling and Management of Women with Preexisting Diabetes or Previous Gestational Diabetes:

Goals of Prepregnancy Planning Program:

- Assessment of patient's fitness for pregnancy.
- Obstetric evaluation.
- Intensive education of patient and family.
- Attainment of optimum diabetic control.

- Timing and planning of pregnancy.

The outcome of pregnancy complicated by pregestational diabetes is improved when care begins before conception. Each visit with paid by a woman of the childbearing age who has diabetes should be considered a preconceptional visit. Discuss family planning and ask the patient about her thoughts concerning a future pregnancy. Results of a glycosylated hemoglobin test provide an overall assessment of glycemic control. Pregnancy should be deferred until excelled of glycemic control is achieved, as indicated by a normal or near normal glycosylated hemoglobin level. Counsel patients about nutrition and educate them how to monitor their blood glucose levels and how to adjust their insulin treatment (Herman, 1991; ADA, 1999). In 1995, O'Sullivan reported the interaction between pregnancy, diabetes, and long-term maternal outcome and concluded that women with gestational diabetes provide an outstanding opportunity for practicing prevention. Their pregnancies expose them to more regular medical care than others at comparable ages. Health education with specific risk factor reduction and instructions can thus be given with an increased of successful pregnancies. CDC, 1998 reported the rate of major congenital malformations in babies born to women with pre-existing diabetes varies from 0 - 5% among women who receive preconception care to 10% among women who do not receive such care. The Northern diabetic pregnancy survey, based at North Shields, Tyne & Wear in 1999 concluded that the diabetic pregnancy remains high risk and delivery of preconception care is suboptimal and must be made more effective (Hawthorn et al, 1999).

Willhoite et al, (1993), Conducted a study on impact of preconception counseling on pregnancy outcomes. Of the total pregnancies 34% occurred in women who received preconception counseling; among these were one major congenital defect 1.6% and 6.4% fetal or neonatal deaths. Sixty six percent of pregnancies occurred in women who did not received preconception counseling, 6.5% infants were born with congenital abnormalities, and 21.1% fetal or neonatal deaths were documented. They concluded that participation in a program of preconception counseling appears to be related to improved pregnancy outcomes among women with pregestational diabetes.

2.4.8.2 Maternal Surveillance

The key to a healthy pregnancy for diabetic woman is tight blood sugar control before and during pregnancy, diabetic treatment plan to keep meals, exercise and insulin in balance (ADA, 1999; Karam, 1999).

2.4.8.2.1 Dietary Therapy

The American Diabetes Association in 2000 recommended "all women with GDM should receive nutritional counseling by a registered dietitian if possible". Individualization of medical nutrition therapy (MNT) depending on maternal weight and height is recommended and should include adequate calories and nutrients to meet the needs of pregnancy. Obese women may do well with moderate caloric restriction as a goal. Diet is considered the major component that can control the diabetes in general and GDM in specific. (Moore, 1994; Reece and Homko, 1993; Orland, 1995; Coustan, 1995; ADA, 2000). Diet alone as a therapy stabilized the glycemic level in 84.2%, 61.5%

and 75.6% of cases respectively in the three years of the study (Jawad, and Irshaduddin, 1996).

2.4.8.2. 2 Insulin Therapy

To deal with metabolic changes in pregnancy and maintain normal blood glucose levels, diabetic women must perform frequent self-monitoring of blood glucose and accordingly the health care team makes immediate dose adjustments. A routine of multiple injections is necessary to replicate normal meal stimulated insulin output in pregnancy. It is recommended that insulin to be started when fasting plasma glucose is > 90 mg /dL and / or 1- h postprandial glucose is > 120 mg/ dl (Reece and Homko, 1993; Jovanovic-Peterson, 1994; Orland, 1995). At the local community the routine includes twice-daily injections of a mixture of short acting (1/3) and intermediate acting (2/3) insulin. Two thirds of the total recommended daily dosage are given in the morning and one third at the evening (UNRWA, 1997).

ADA, 2000 stated that insulin is the only pharmacological therapy shown to reduce fetal morbidity when added to MNT. Human insulin is preferred in pregnancies in order to avoid the formation of insulin binding antibodies. Insulin therapy is recommended when MNT fails to maintain fasting whole blood glucose levels ≤ 95 mg/dl (5.3 mmol/l) or 2-h postprandial whole blood glucose level ≤ 120 mg/dl (6.7 mmol/l). Oral glucose-Lowering agents are not recommended during pregnancy. They fail to control diabetes with pregnancy properly. As it cross the placenta, it may be teratogenic and may cause severe hypoglycemia in the newborn (ADA, 2000).

Reports from Cape Town, South Africa suggest that oral hypoglycemic agents may in fact be safe in pregnancy, but most experts prefer insulin if diet therapy is unsuccessful (Huddle, 1999). In Los Angeles County cohort study on patterns of congenital anomalies affecting infants of women with GDM (n = 3764) or Type 2 diabetes (n = 416). It was found that exposure to sulfonylurea agents was significantly more frequent in infants with major anomalies and with genetic syndromes than in infants without anomalies (Schaefer-Graf, 2000). When insulin was available maternal mortality fell dramatically from 45 - 2% for all pregnancies over the following decade, 60% of perinatal mortality dropped from 60 - 20% for all pregnancies by mid-century (Haire-Joshu, 1992).

Landon's survey of perinatologist (1990) indicated that the most utilized criterion was persistent abnormal fasting blood sugar or elevated postprandial levels (> 120 mg/dl) as an indication for initiation of insulin. However, the persistent demonstration of 15 - 45% macrosomia rates even in "well-controlled" GDM pregnancy has led some investigators to consider routine prophylactic insulin therapy in all GDM patients. Insulin therapy was taken in 7.4% among the risk factor GDM group and in 14.2% of the universal GDM group (P>0.05) (Griffin, et al, 1999). In 1997, El Raoof reported that 62.42% of the patients were taking insulin.

Jawad and Irshaduddin, 1996 reported that diet alone as therapy stabilized the glycemic level in 84.2%, 61.5% and 75.6% of cases in three years respectively. Twice daily insulin was required for the desired results by 3.5%, 11.5% and 9.0% of the women respectively. The mean birth weights of the newborns were 3.30 kg, 3.24 kg and 3.17 kg in the three years respectively

which indicate a satisfactory glycemic control during pregnancy. They concluded that early screening of pregnant women gives an early diagnosis of GDM, good management, close monitoring and good patient compliance which give a satisfactory outcome for an infant of normal weight, low incidence of perinatal losses and unnatural at-term delivery.

2.4.8.2.3 Pregnancy Care

2.4.8.2.3.1 Team Approach

The management of pregnancy in women with diabetes requires a team approach. The necessary specialists involved are obstetricians, neonatologists, diabetologists, diabetes educators and dieticians. Antenatal visits should include assessment and management of glycaemic control, diabetic complications and obstetric complications (ADA, 2000). The quality of diabetic control, the presence or absence of medical complications and fetal status dictates the timing of delivery. The goal is to achieve 39 weeks (38 completed weeks) and then proceed with delivery. Cesarean sections are performed for obstetric indications (Crombleholme, 1999). At local community the diabetic pregnant is referred to hospital in the last month of pregnancy or earlier if needed. Delivery is advised to be at least 38 weeks or later in the absence of obstetric problems. Vaginal delivery is preferred. Caesarian section is indicated in case of pelvic disproportion, abnormal uterus, placenta praevia, marked macrosomia and previous CS.

2.4.8.2.3.2 Psychosocial Support

The diabetic pregnant women are exposed to additional stress because of many and more regular medical care, follow a carefully prescribed

diet, monitor blood sugar level several times a day and an economic burden. They are in need for more psychosocial support for reassurance and motivation in order to have healthy babies. As early pregnancy is often associated with emotional as well as metabolic liability, weekly antenatal visits are recommended for women with diabetes (Hollingsworth, 1994). Post natally, the pregnant woman is followed up during the perperium period especially for those with GDM.

2.4.8.2.3.3 Fetal surveillance

Fetal surveillance in diabetic pregnancy starts in preconception and continues throughout the pregnancy utilizing techniques to detect the fetal growth, evaluation, prediction of fetal weight at 36 weeks and precise documentation of obstetric date which will facilitate management later in pregnancy (ultrasonography) (Moore, 1994).

In Gaza Province few studies were carried out on different aspect of reproductive health, on anemia during pregnancy (1987; 1991), on family planing (1994; 1999), determinants of antenatal care utilization and on risk factors associated with anemia among pregnant women (1995), maternal and child health improvement and evaluation (1997) and studies on consanguineous marriage and the last on assessment of high risk pregnancy services in PHC carried on (1999). But there are no studies on diabetes mellitus with pregnancy. There is an ongoing project in Gaza on diabetes with pregnancy. The Gaza project studies the comparison of effectiveness of fasting blood glucose estimation and 50 gm glucose challenge test as screening tools for GDM by UNRWA.

High-risk pregnancy management was developed in the 1987, and was translated into forming a high-risk pregnancy committee in Gaza, the first meeting of this committee was on the 4th of May 1988 (Palestine WHO, 1995).

In order to ensure the provision of high quality antenatal care, a plan was developed by UNRWA - Gaza field in 1999 to train all concerned staff. The risk approach is used as a tool to provide preventive care to the majority of pregnant women whose condition is normal and to give special attention and care to those identified as at risk (UNRWA, 1999).

2.4.8.2.3.4 Monitoring and Follow Up

Different studies were discussed and approved the following: (Hollingsworth, 1994; Crombleholme, 1999; ADA, 2000).

1- Glycosylated Hemoglobin (HbA1c) in normal healthy subject HbA1c levels are between 3-6% while in diabetic patients this value by increase up to four fold. Glycosylated Hemoglobin levels help in determining the quality of glucose control both before and during pregnancy. Measurement is important for women with pre-existing diabetes. It should be taken every 4 - 6 weeks and at least once every trimester to assess glyceamic control in pregnancy.

2- To measure the maternal serum alpha-fetoprotien level at 16 weeks of pregnancy to screen for fetal anomalies. Close monitoring of metabolic status is essential in pregnant women with Type 1, Type 2 and GDM for successful outcome of diabetic pregnant.

3- Daily self-monitoring of blood glucose is important to maintain normal blood glucose level.

4- Blood pressure and urine protein monitoring in addition to body weight check up regularly to detect hypertension and body weight.

5- Ultrasonography especially in early third trimester to assess fetal growth.

In 1993 Mohsen, carried a case control study on 30 diabetics and 30-control groups. The result suggested that, HBA 1c was found within normal level in 40% of the diabetics and 100% of the controls, elevated in 60% of diabetics and none of the controls and there was a positive association between HbA1c level and weight of the newborn and it's Apgar score. He concluded that HbA 1c can be used as an index of control of diabetes as well as for prediction of fetal macrosomia. It is superior over urine or blood glucose assay and the use of ultrasonography is of great help in assessment of fetal condition or hydraminous.

In 1999 El-Nady, carried a study on 60 pregnant women, there was a significant increase in serum fructosamine in first trimester as a measure of glycosated serum protein in diabetic pregnant women, and detected only 65% of GDM and HB A1c were (7.7% - 40% vs. 2.6% - 9.1%) which is significantly higher in the diabetic group. He concluded that, the biophysical profile scoring is a tool for antenatal fetal monitoring. Doppler ultrasonography is a clinical useful method for evaluation of diabetic pregnancy and recommended as an earlier predictor of fetal complications that may reflect possible defects in the health services provided. The postpartum HBA1c may be of value as a screen for unrecognized GDM.

2.4.9 Future Consideration

Glucose intolerance during pregnancy poses significant risks for both mother and fetus. Consistent supervision of the pregnancy outcomes requires meticulous supervision of the pregnancy by a skilled and knowledgeable practitioner. Gestational diabetes usually goes away after pregnancy, but the chances are 2 in 3 that it will return in future pregnancies. Many women who have gestational diabetes go on to develop Type 2 diabetes some years later. Certain basic lifestyle changes may help prevent diabetes after gestational diabetes. Loosing weight, this can help to avoid developing type 2 diabetes. Follow simple daily guidelines, like eating a variety of foods including fresh fruits and vegetables and limiting the fat intake (ADA, 1999; Orland, 1995).

What is clear from above, inspite of the limited resources that the implementation of a management program based on principles is needed. What is discussed above can result in favorable fetal outcomes for women in local community.

The literature review shows that diabetes with pregnancy is a widespread health problem, which requires great attention to decrease its prevalence to the lowest possible level. This can be achieved by intertwined efforts of those who appreciate the value of mankind.

Chapter 3
Materials and Methods

Chapter (3)

Materials and Methods

3.1 Study Design

The type of the study is cross sectional-case control study. It is chosen because of the limited time given for the data collection. It is useful for descriptive purposes and it can easily measure the reported rate of diabetes mellitus with pregnancy. A case control study was used because it limits the problem to be researched and attempts to limit the effects of extraneous or outside variable that are not being studied. In the present case control study we enroll a group of women with disease "cases" the diabetic group and a group without disease "control" and compared their patterns of previous exposures. By using case control study we could quantify the risk factors that associate DM with pregnancy and the adverse effect of DM in pregnancy. Further, results can provide information for evaluation of some ongoing maternal services related to diabetes with pregnancy.

3.2 Study Population

The study population consists of all newly registered pregnant women at the Southern area of Gaza Province through 1999 to end of June 2000 in MoH and UNRWA primary health care centers. By the end of December 1999, the total number of newly registered were 3264, 8445 pregnant in MoH and UNRWA respectively. By the end of June 2000, the total number of newly registered were 1778, 4444 pregnant women in MoH and UNRWA respectively.

3.3 Sample Population

The sample population (diabetic cases and control groups) included all registered diabetics (pre-gestational, gestational) pregnant or delivered women attending the selected MCH centers and clinics during the period of January 1999 to end June 2000 at Governmental and UNRWA PHC centers. These women are the target group. The diabetic case group was matched randomly with two fold of normal pregnancy (control group). Eighty-four pregnant women with diabetes mellitus matching with one hundred sixty eight women registered at antenatal clinic at the same period constitute the sample population.

3.4 Sampling Method

Review of all the ledgers (Registry) of maternal health records, in antenatal care utilization and in the high-risk clinics at primary health care centers in Southern area in MoH and UNRWA for the numbers of registered pregnant women during the period 1999 to end of June 2000.

Review of all the maternal health records which were classified and reported as pregestational, gestational diabetes mellitus complicated pregnancy according to previous glucose blood tests , which are listed as diabetic group.

Lists of all diabetic women from the above review, were organized in a table by their full name, serial number of maternal health record, exact addresses, names of husbands, telephone number if present, and other relevant data for easy contact.

The control group women were selected randomly and typically to the diabetic group criteria which are: resident in the area of the study (Kan Younis & Rafah) from the same maternal health records, two para or more during the same

period January 1999 to June 2000, regardless the age and gestational age. Two fold, one pregnant before and one after each diabetic case were selected. Final lists of both diabetic and control groups were arranged in a table.

3.5 The Study Area and Place

The study was carried out in Southern Gaza Province PHC centers. Two central govermental PHC centers were included , Shouhada' Khan Younis and Rafah Centers. In UNRWA four health centers in Khan Younis, Ma'en, Rafah and Tal Sultan, and shaboura sub center were included. In the above mentioned MCH services which are available for ANC services and risk pregnancy care.

3.6 Setting of the Study

Women who were included in the study were interviewed during the working hours at the health centers, where they are registered. Twenty women were interviewed in their homes, as it was difficult for them to reach the centers.

3.7 Study Methods

Source of Information

1- Review all the ledgers (Registry) of maternal health records designated in MCH at primary health care centers in Southern area in MoH and UNRWA for the numbers of registered pregnant women through 1999 and half of year 2000.

2- Review the medical maternal health records (MHR) for all pregnant women registered with diabetes mellitus, and double fold pregnant selected randomly as control cases accordingly (Appendix IV and V).

3- The self-report, direct Structured interview questionnaire for all the study sampled population: An administered questionnaire interview face to face was developed with closed and open structure questions (Appendix VIII & IX).

4- Observation on height, weight and blood pressure was recorded for all women during the study period. The researcher took measurement by using one constant standard scale. Height was measured to the nearest centimeter without shoes on using height scale (Gold, Power Tape Professional).

Weight was measured with the woman's clothes on, but without footwear to the nearest 0.1 kg. BMI was calculated by dividing the Prepregnancy weight in Kilograms (kg) by the height square meters (m^2). In order to use BMI as an indicator for overweight and obesity, it's values were arranged into 2 categories: BMI < 27 kg/m2 and the second of equal or ≥ 27kg/m2.

During the current pregnancy, Prepregnancy weight was recorded as the patients recalled or registered, at the first antenatal registration usually before 14 weeks post conception. For the delivered one , prepregnancy weight was recorded by using the measurement taken by the researcher. Blood pressure (BP) measured using one standard Digital Blood Pressure Monitor (UA-767) and start at 150 level pressure. Hypertension was defined and classified according to the new classification, that is, a systolic BP 140

mmhg or over, or a diastolic of 90 mmhg or over, but data were not included into the study results

3.8 Questionnaire Design

a) An administered interview questionnaire was developed with closed and open structure questions, face to face for the entire study sample. The questionnaire was designed in English (Appendix VIII) and then translated into Arabic (Appendix IX), as it is the mother language for all the target population. In each questionnaire, an explanatory letter had been attached to cover the ethical issue (Appendix X).

The questionnaire included six areas of questions as follows:

1) Personal information included the demographic data of each woman in terms of locality, place of living, age of both the wife and her husband, date of birth, age at marriage, work of the husband and that of the wife if present, the cosangenious marriage if present (first cousin or secondary relation). Socioeconomic factors included years of education, occupation for the wife and the husband and place of living.

2) Past history of NCD especially that of DM or GDM and family history of diabetes in their immediate family like father, mother, siblings or first cousins.

3) Obstetric history of **previous pregnancies** which includes gravida and parity order, number of abortions, number of stillbirths, number of living children, number of dead infants or children and the cause of their death , history of low birth weight and macrosomia (BW ≥4 kg) and history of congenital anomalies. Questions about **last pregnancy** included gestational age at first antenatal visit, weight of mother before pregnancy or at first antenatal visit ,number of

antenatal visits, history and type of complications, outcome, health status and pregnancy health related problems e.g. hypertension, DM , anti partum or post partum hemorrhage and others. **Current pregnancy:** order of pregnancy, gestational age, gestational age at first antenatal visits, mother body weight, number of antenatal visit, health status and pregnancy health related problems .

4) Infants and children morbidity which includes convulsion, cerebral palsy, mental handicap or retardation, epilepsy or any other genetic disease.

5) Medications if they were used during the last and current pregnancies as ferrous sulfate, folic acid., anti hypertensive drugs and anti diabetic treatment by insulin, diet.

6) Views of the women through knowledge and satisfaction on the existing maternal services.

b) Observation on height, weight and blood pressure as explained in paragraph (3.7.4).

3.9 Procedures and Ethical Consideration

1. An official letter of approval to conduct the research was obtained from the Helsinki Committee which is the only authorized official body to give permission in health related researche in the Gaza Province.
2. Permission letter to conduct the study at PHC clinics from both MoH and UNRWA health authorities (Appendix XI & XII).
3. Explanatory letter for all participants, which explains the study aim, confidentiality and anonymity of the information with optional participation.
4. The study instrument is anonymous. Identification information such as name and address is often recorded on a separate page that can be detached

and kept separate from other types of data. No one had been given access to completed questionnaires except the researcher. The researcher dealt herself with all processing steps of the samples and records to ensure privacy and accuracy.

3.10 Preparation for the Field Work

At the initial visit to primary health care centers, where antenatal care and management of DM among pregnant women followed the routine schedule used for such high-risk cases at each center. In order to facilitate communication of the investigator with the study population, the investigator prepared final lists of both groups as described in paragraph (3.4) and distributed in different places of the study clinics e.g. in family planning, high risk clinic, MCH, archive and non-communicable clinic were approached.

3.11 Inclusion and Exclusion Criteria

3.11.1 Inclusion Criteria

The eligible women to be included in the study were all delivered and /or pregnant, registered at primary health care centers and classified as DM with pregnancy. Matching each case with two controls of normal pregnancy, regardless maternal age or gestational should age and who are registered at primary health care centers. Women were selected as described in paragraph (3.4):

- Resident in the area of the study (Khan Younis & Rafah).
- Parity two or more.
- Routinely examined for blood glucose test at their clinics.

3. 11. 2 Exclusion Criteria

All women who obtained ANC outside the Southern Governorates of Gaza Province were excluded, as they do not represent the situation inside the study area. In control group, primigravida, parity one and women refused to participate in the study were excluded. In addition the ten subjects whom were selected for pre-test were excluded.

3.12 Pre-test Study

A pre-test study was conducted as a small scale - version, or trial run, done in preparation for the major study. Ten pregnant women were selected randomly at Shouhada' Khan Younis center in MCH clinic during the day allocated for the study. The local primary health care nurses informed these women during antenatal visit about the meeting with the researcher. The researcher gave an explanation of the study. Face to face interviews were carried out. The aim of the pre-test study was to test the questionnaire validity and the suitability of the questionnaire. As a result of the pre-test some changes were performed including minor adjustments that were made to improve clarity but no major changes were judged necessary, the pre-test facilitate the orientation and adjustment to the sequence of the procedures and activities of the study.

3.13 Data Collection

Data collection started in the last week of April through to the end of June 2000. The researcher wrote every appointment for every clinic in agenda by the date, time and setting for easy contact and good time management. The first

day was 24/ 4/ 2000. The researcher was always on time for interviewing of women, which gives respectable meaning for research. The researcher collected all data by herself to ensure accuracy, ethical, cultural and religious needs of the participants. Standard information was prepared to provide subjects who ask routine questions about the study. Data collection took approximately two months. The average time for filling in one questionnaire was about twenty minutes. Therefore, about 8 weeks were taken to collect information in the field from subjects. The response rate was 98%.

3.14 Data Analysis

All data were entered and analyzed using the Epi6-Info (statistical program) checking and cleaning was performed. Frequency distribution, cross tabulations and Chi square tests were used. For continuous variables of normal distribution, the student's t-test was performed and Chi -square test were used to compare groups and discrete data.

Chapter 4
Results

CHAPTER 4

Results

4.1 Study Population

The study population is all pregnant women who were and are still registered with diabetes mellitus in PHC centers of MOH & UNRWA in the Southern areas of Gaza Province. In total 84 women were the diabetic group, out of them 24 women were registered as pre gestational DM and 60 women as GDM at PHC centers during the study period. The diabetic group was in comparison to 168 women of the control group. The sample population was distributed by area as 154 women in Khan Younis and 98 women in Rafah Governorates.

4. 2 Prevalence of DM with Pregnancy

The results showed that the number of newly registered pregnant women at PHC-MoH Southern area during 1999 and at first half of 2000 was 3264 and 1778 respectively. While the number of newly registered pregnant women at UNRWA PHC Southern area during 1999 and at first half of 2000 was 8445 and 4444 respectively. In total the number of newly registered pregnant women at PHC Southern area during 1999 and at first half of 2000 was 11709 and 6222 respectively (Table 1). The study results of the reported prevalence of different types of DM with pregnancy are presented in Table 2. It was found that the reported period prevalence of diabetes mellitus among the study population through 1999 was 0.49%, and from January 2000 through June 2000 was 0.41%. This gives collective prevalence that equal to 0.47 % through the study

period. It is estimated that the reported prevalence of GDM in 1999 and first half of 2000 was at 0.36%, 0.29% respectively. The findings of UNRWA showed that the prevalence of DM with pregnancy was 0.52%, 0.47% in 1999 and at first half of 2000 respectively, GDM presented 0.44% in 1999 and 0.34% at first half of 2000. In MoH, prevalence of DM with pregnancy was 0.27%, 0.28% respectively and GDM was 0.15%, 0.17% in 1999 and at first half 2000 respectively (Table 2). It can be seen that the findings at UNRWA are higher than MoH but still below the expectation.

Table 1 The distribution of Pregestational DM and GDM during1999 and first half of 2000, by service providers

Place of services	Newly registered pregnant women 1999	2000	No. of pregestational registered pregnant women 1999	2000	No. of GDM registered pregnant women 1999	2000
MoH	3264	1778	4	2	5	3
UNRWA	8445	4444	12	6	37	15
Total	**11709**	**6222**	**16**	**8**	**42**	**18**

Table 2 The reported prevalence of Pregestational DM, GDM and DM during pregnancy in1999 and the first half of 2000, by service providers

Place of services	Prevalence of DM 1999	2000	Prevalence of GDM 1999	2000	Prevalence of PGDM 1999	2000
MoH	0.27	0.28	0.15	0.17	0.12	0.11
UNRWA	0.52	0.47	0.44	0.34	0.14	0.13
Total	**0.49**	**0.41**	**0.36**	**0.29**	**0.14**	**0.13**

4. 3 Diabetes Mellitus Status by Sociodemograhic and Socioeconomic Study Variables Characteristics

Sociodemographaic variables were studied (Health services, education of women and their husbands, residency, occupation of women, husbands and place of living) summarized in Table 3.

4.3.1 Characteristics of the Study Population

Table 3 describes social variables among the studied group, the study population comprising of 252 women, of them 84 diabetic group and 168 control group, the sample population distributed by area as 154 women in Khan Younis Governorate and 98 women in Rafah Governorate. Of the total sample, 42 registered pregnant women were at MoH, PHC whereas 210 registered pregnant women were at UNRWA, PHC. Mothers' education; the results indicate that there is no statistical significance between the level of mother education and diabetes status, P-value = 0.248, Chi-square = 2.79, D.f. = 2. Are shown in Table 3. Mothers' Occupation; the study showed that the number of women who are working outside their homes with payments were 16 women (6.4%) of the total sample population which equal to 19.0% of diabetic group. The majority of women worked as housewives who equal to 93.6%, which is statistically not significant. The results concerning the locality, show 50.4% of the total sample are living in city, which equal to 42.9% diabetics women while 20.2% of diabetic group living in village. Of the total study population 31.7% women were living in camps and 17.9% in villages. There are no statistical significance between health status and place of living (P-value = 0.28517). By testing the place of living and diabetic health status, no significant difference was observed, because the situation in the Southern area relatively is similar,

so we cannot consider a place of living as an indicator of socioeconomic living as in other studies.

4.3.2 Husbands' Characteristics

Table 3 shows socioeconomic variables of the husbands. Concerning the husband education, the results showed no statistically significant differences in the level of education among husbands between the two groups. When testing mothers education and their husbands education, it was observed that high literacy education was double fold among husbands in the study groups P-value = 0.000. Regarding husbands' occupation; the study shows that the husbands of 103 (40.9%) of the total study population were employees, out of them 35 (41.7%) were husbands of the diabetic group while the husbands of 22 (8.7%) of the total study population were not working, out of them 10 (11.9%) were among husbands of the diabetic group. Where 39 (46%) of diabetic group their husbands were general worker. The differences between women husbands' occupation and diabetes health status were not statistically significant.

4.3.3 Consanguineous Marriage

The total study population included 145 women (57.5%) who had consanguineous marriage. Whereas 86 women (59.3%) had first degree cousin, which represents 34.1% of the total study sample population, out of which 26.3% of gestational diabetics pregnant women compared to 73.7% of the control. No statistically significant relationship between pregnant women having DM or GDM and consanguinity marriage, P-value = 0.325 and 0.283 respectively. Studying these variables was an attempt to enlighten any assumption of etiological relationship of diabetes status.

Table 3 The distribution of the study population by sociodemographic Variables

Characteristics	DM group		Control group		Total	
	No.	%	No.	%	No.	%
Total	84	100	168	100	252	100
Health services						
MoH	14	16.7	28	16.6	42	16.7
UNRWA	70	83.3	140	83.4	210	83.3
Mother education						
0-6 years	20	23.8	27	16.1	47	18.7
7-12	55	65.5	115	68.4	170	67.5
≥ 13	9	10.7	26	15.5	35	13.8
Women residency (Locality)						
Khan- Younis	51	60.7	103	61.3	154	61.1
Rafah	33	39.3	65	38.7	98	38.9
Place of living						
City	36	42.9	91	54.2	127	50.4
Camp	31	36.9	49	29.2	80	31.7
Village	17	20.2	28	16.7	35	17.9
Husband occupation						
No work	10	11.9	12	7.1	22	8.7
General worker	39	46.4	88	52.4	127	50.4
Employee	35	41.7	68	40.5	103	40.9
Consanguineous marriage						
Yes	52	61.9	93	55.3	145	57.5
No	32	38.1	75	44.7	107	42.5

4.4 Risk Factors Associated and Enhancing Occurrence of DM with Pregnancy

The study showed that 49 women (81.7%) of the interviewed women registered with GDM had a positive history of previous GDM during previous pregnancies, while non-of the control group had a past history of GDM. The differences are statistically significant between both groups in exposure of previous history of GDM P-value 0.000, chi-square 174.76. The results suggest that any woman with a history of GDM in the previous pregnancy will be extremely at risk to develop GDM in the current pregnancy. Although history of GDM is a high risk factor associated DM and during the next pregnancy. The comparisons between the two groups of the study were excluded from considered risk factors.

Four general risk factors were considered that enhancing occurrence of DM in general and GDM specifically, these factors are: Maternal age ≥ 31 years, positive family history of DM, Obesity (BMI ≥ 27) and Parity order of ≥ 6. It's believed that most of the GDM actually were undiagnosed diabetes-antedating pregnancy. Interestingly enough when GDM was separated out from the group with diabetes mellitus, the association as predicted for diabetes with pregnancy is increased.

4.4.1 Maternal Age on Conception

The study shows that 143 women (56.7%) of the total study population fell in the age group ≥ 31 years old, approximately half of them were diabetic which equal to 85.7% of diabetic group as a whole compared to 42.3% in control, this was the largest age group. The remaining 109 women fell in the age group ≤ 30 years old, out of which 12 women (11.0%) who equal to 14.3% were

diabetics. Where 18 women (75.0%) of pregestational pregnant were at the age group of ≥ 31 years old, while 25.0% of the same group were less than 30 years old.

Table 4 The relationship between maternal age and occurrence of DM with pregnancy

Age groups	DM group		Control group		Total	
	No.	%	No.	%	No.	%
≥ 31 years	72	85.7	71	42.3	143	56.7
≤ 30 years	12	14.3	97	57.7	109	43.3
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 8.2 **P-value = 0.000** **Chi-square = 43.08**

Table (4) shows that there is a statistical significant difference between maternal age in the diabetic and control groups. This suggests that pregnant women fell in the age group ≥ 31 years old are more exposed to DM with pregnancy than pregnant women with age ≤ 30 years old by 8.2 times. By stratification the diabetic group, testing the GDM subgroup, still the largest age fell in ≥ 31 years group among GDM compared to control which was equal to 90%, while 10.0% of the same group fell in ≤ 30 years group. Table (5) shows that the differences between the GDM subgroup and control groups as regards the maternal age were highly statistically significant. Which means that women with age of ≥ 31 years old have the chance to exposed to GDM 12.3 times than pregnant women with age ≤ 30 years old are shown in Table 5.

Table 5 The relationship between maternal age and occurrence of GDM among the study groups

Age groups	GDM group No.	%	Control group No.	%	Total No.	%
≥ 31 years	54	90.0	71	42.3	125	54.8
≤ 30 years	6	10.0	97	57.7	103	45.2
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 12.3 **P- value = 0.000** **Chi-square = 40.68**

4.4.2 Family History of DM

It was observed that 128 women (50.8%) of the total study population had a family history of DM, 61 (47.7%) out of them were registered as DM with pregnancy, while 23 (18.5%) of diabetic women had no family history of DM.

Table 6 The relationship between family history of DM and occurrence of DM with pregnancy among the study groups

Positive family history of DM	DM group No.	%	Control group No.	%	Total No.	%
Yes	61	72.6	67	39.9	128	50.8
No	23	27.4	101	60.1	124	49.2
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 4 **P-value = 0.000** **Chi-square = 24.00**

Table 6 described that women registered with DM with pregnancy 61 (72.6%) women reported positive family history of DM, while 67 (39.9%) of the control group had reported family history of DM. It was observed that the difference between the two groups was highly statistically significant. Table 7 shows the supportive results for a family history of diabetes in GDM subgroup, that women

reported family history of DM and registered as GDM were 42, which equal to 70% compared to 67 (39.9%) pregnant women of control.

Table 7 The relationship between family history of DM and occurrence of GDM among the study groups

Positive family history of DM	GDM group		Control group		Total	
	No.	%	No.	%	No.	%
Yes	42	70.0	67	39.9	109	47.8
No	18	30.0	101	60.1	119	52.2
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 3.52 **P-value = 0.000** **Chi-square = 16.07**

It is clear that the difference between GDM group and control group is highly statistically significant. This means that pregnant women with family history of DM are predicted to be exposed to DM with pregnancy or GDM by 4 or 3.52 times respectively than pregnants with no history of family history of DM.

4.4.3 Body Mass Index

The relationship between BMI and DM or GDM subgroup compared with the control group was described in Table (8 & 9). The study results show that 156 women (61.9%) of the total study population presented with BMI ≥ 27 group, out of them 68 (43.6%) women were registered with DM in pregnancy, which equals 80.9% of diabetics compared to 88 (52.4%) women of the control group. The remaining 96 women of the total study population were observed to have BMI < 27, out of them 16 women (16.7%) were constitute 19.1% of diabetics.

Table 8 The relationship between BMI ≥ 27 and occurrence of DM with pregnancy among the study groups

BMIG	DM group No.	%	Control group No.	%	Total No.	%
≥ 27	68	80.9	88	52.4	156	61.9
< 27	16	19.1	80	47.6	96	388.1
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 3.86 **P-value = 0.000** **Chi-square = 19.38**

The difference between the diabetic and control group was highly statistically significant. In focusing to test BMI in GDM a subgroup was separated from DM group (are shown in Table 9), 51 women (85%) out of 139 women presented with BMI ≥ 27, which equal to 85.0% of GDM subgroup compared to 52.4% women of control group. It is shown that the association has increases.

Table 9 The relationship between BMI ≥ 27 and occurrence of GDM

BMIG	GDM group No.	%	Control group No.	%	Total No.	%
≥ 27	51	85.0	88	52.4	139	61.0
<27	9	15.0	80	47.6	89	39.0
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 5.15 **P-value = 0.000** **Chi-square = 19.77**

Table 9 shows that the differences were statistically significant between GDM subgroup and control group regarding BMI, which shows increased and strong association. This means that pregnant women with BMI ≥ 27 are predicted to

be exposed to DM with pregnancy or GDM by 3.86 or 5.51 times respectively than pregnants with BMI ≥ 27.

4.4.4 Parity Order

The mean number of parity was 5.3 with S.D = 2.7. Table 10 & 11 shows that the parity orders in both diabetic group, GDM subgroup compared to control group are statistically significant. It was observed that 146 (57.9%) of the interviewed women reported a parity order of ≤ 6, 25 (29.8%) of them registered as DM with pregnancy. The remaining 106 (42.1%) of the total population reported a parity order of ≥ 6, out of them 59 (70.2%) of diabetics. While 45 out of 60 women (75.0%) of GDM subgroup, 14 pre-gestational women out of 24 (58.3%) had parity of ≥ 6. This indicates the strong association between the high parity and prediction to have GDM. This means that pregnant women with a parity order of ≥ 6 are predicted to be exposed to DM with pregnancy or GDM by 6.08 or 7.72 times respectively than pregnants with parity order of ≤ 6.

Table 10 ***The relationship between parity order ≥ 6 and occurrence of DM with pregnancy***

Parity order	DM group		Control group		Total	
	No.	%	No.	%	No.	%
≥ 6	59	70.2	47	28.0	106	42.1
< 6	25	29.8	121	72.0	146	57.9
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 6.08 **P-value = 0.000** **Chi-square = 41**

Table 11 The relationship between parity order of ≥ 6 and occurrence of GDM among the study groups

Parity order	GDM group No.	%	Control group No.	%	Total No.	%
≥ 6	45	75.0	47	28.0	92	40.4
< 6	15	25.0	121	72.0	136	59.6
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 7.72 **P- value = 0.000** **Chi-square = 40**

4.4.5 Summary of Mix Risk Factors

Table 12 described the different risk factors among total study population, it is clear that these risk factors are cumulative among the total study population, the highest distribution was the BMI ≥ 27. It was observed that 156 women (61.9%) of the total study population had BMI ≥ 27, 143 (56.7%) women were fell in the age group ≥ 30 years old, 128 (50.8%) women had a family history of DM and 106 (42.1%) women had parity order of ≥ 6.

Table 12 The distribution of different risk factors among the interviewed women

Risk factor	Frequency No.	%
BMI ≥ 27	156	61.9
Maternal age ≥ 30 years	143	56.7
Family history of DM	128	50.8
Parity order ≥ 6	106	42.1

The effect of these risk factors on prediction of DM or GDM specifically is described in Table 13 & 14 and illustrated in Figure 1& 2. It is clear that all these risk factors have high distribution among diabetic group and GDM sub group specifically, where in the later the association increases. Family history of DM is the highest distribution among GDM subgroup while maternal age as risk factor is the highest distribution in DM group compared to the control.

Table 13 Distribution of different risk factors among DM and control groups

Risk factor	DM group		Control group	
	No.	%	No.	%
BMI ≥ 27	**68**	**81.0**	**88**	**52.4**
maternal age ≥ 30 years	**72**	**85.7**	**71**	**42.3**
Family history of DM	**61**	**72.6**	**67**	**39.9**
Parity order ≥ 6	**59**	**70.2**	**47**	**28.0**

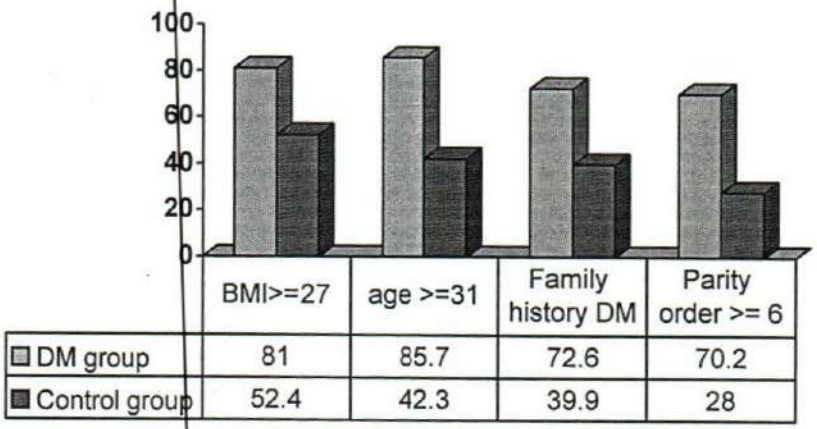


Figure 1 Distribution of risk factors by interviewed women groups

Table 14 Distribution of risk factors among GDM subgroup and control group

Risk factor	GDM group No.	GDM group %	Control group No.	Control group %
BMI ≥ 27	51	85.0	88	52.4
maternal age ≥ 30 years	42	70.0	76	39.9
Family history of DM	54	90.0	71	42.3
Parity order ≥ 6	45	75.0	47	28.0

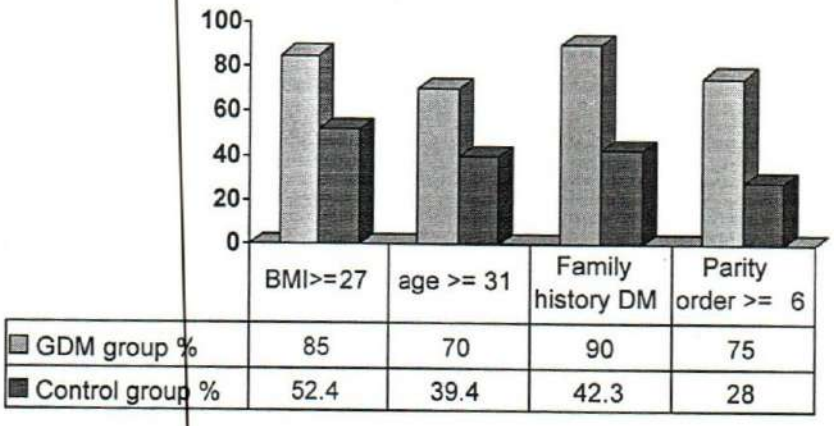


Figure 2 Distribution of risk factors among GDM subgroup and control group

4.4.6 Quantification of Different Risk Factors Among the Study Population

The number of these risk factors among women was quantified, described and illustrated (Figure 3, 4 & 5). The majority of women had different risk factors; 24.6% of the total study population had two risk factors while 12.3% had no risk factors. This indicates the cumulative presence of risk factors among pregnant women is high and more among pregnant diabetics.

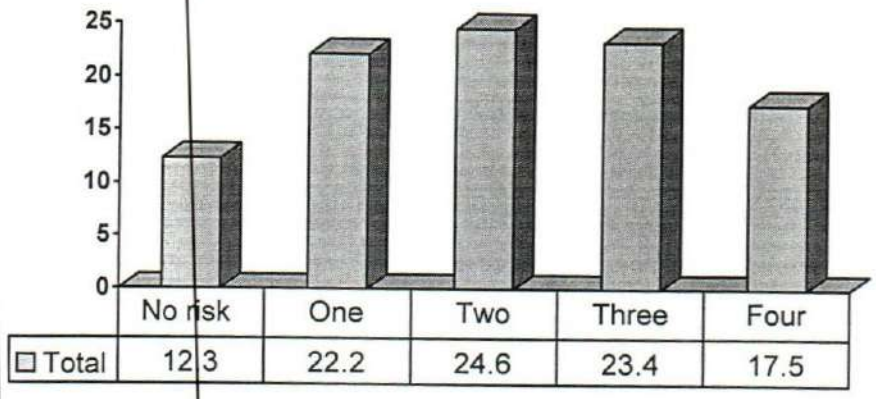


Figure 3 Quantification of risk factors among the total study population

Study results showed that 43.3% of GDM subgroup reported four risk factors compared to 5.4% of control group while 36.7% reported three risk factors among GDM group compared to 16.6% of control group. Where 17.8% of the control group had no risk factors while non-of registered GDM women were reported with any risk factors. The previous findings revealed that the chance of women to have DM with pregnancy and/or GDM specifically is increased steadily with increased prevalence of risk factors and this increase becomes more liable to occur when there are more cumulative risk factors (Figure 4 & 5).

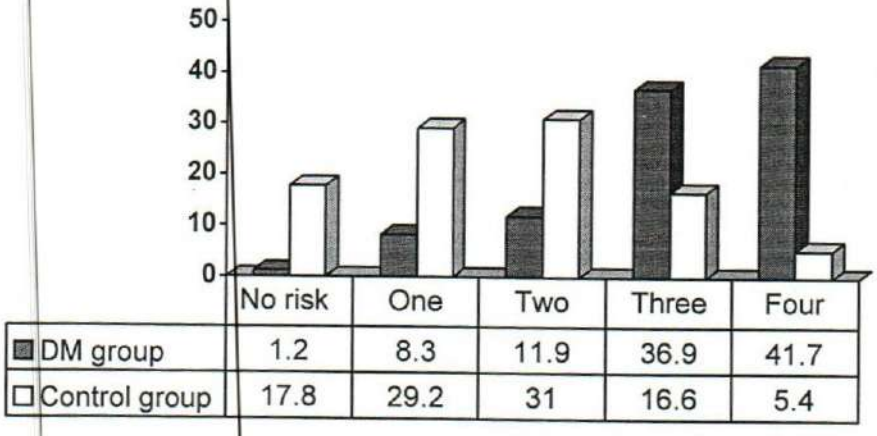
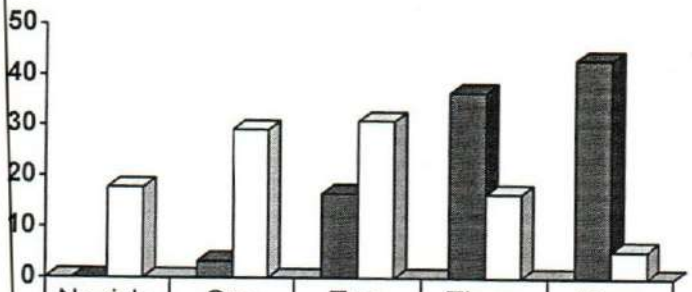


Figure 4 Quantification of risk factors by study groups



	No risk	One	Two	Three	Four
GDM group	0	3.3	16.7	36.7	43.3
Control group	17.8	29.2	31	16.6	5.4

Figure 5 Quantification of risk factors among GDM subgroup and control group

4.5 Undesired Outcome of Pregnancy as an Indicator of Occurrence DM with Pregnancy

The result of past history of undesired outcome of pregnancy is described as follows:

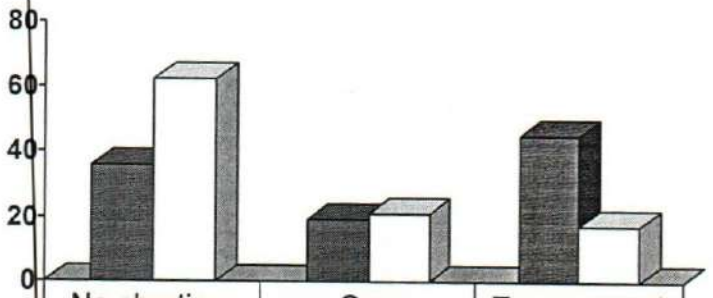
4.5.1 Abortions

In general, the study shows that 134 (53.2%) of the interviewed women did not report any history of abortions while 51 (20.2%) women reported history of one abortion, 16 (31.4%) of them registered with DM with pregnancy, 10 (16.7%) women registered with GDM. It was observed that 30 (11.9%) of interviewed women reported two abortions, 17 (56.7%) of them registered as DM with pregnancy and 12 (20.0%) of them registered with GDM and 37 (14.7%) of the interviewed women reported three or more abortions, 21 (56.8%) of them registered as DM with pregnancy, 12 of diabetics registered as GDM (Table 15 & Figure 6).

Table 15 Distribution of reported abortion among study population

Risk factor order	DM group No.	%	Control group No.	%	Total No.	%
No abortions	30	35.7	104	61.9	134	53.2
One	16	19.1	35	20.8	51	20.2
Two or more *	38	45.2	29	17.3	62	26.6
Total	**84**	**100**	**168**	**100**	**252**	**100**

*** Repeated abortion**



	No abortions	One	Two or more*
DM group	35.7	19.1	45.2
Control group	61.9	20.8	17.3

** Repeated abortion*

Figure 6 Distribution of reported abortion among study population

Table 16 Distribution of reported abortion among study population

Risk factor order	DM group No.	%	Control group No.	%	Total No.	%
Two or more*	38	45.2	29	17.3	67	26.6
None or one abortion	46	54.8	139	82.7	185	73.4
Total	**84**	**100**	**168**	**100**	**252**	**100**

** Repeated abortions*

Odds ratio =3.97 **P-value = 0.000** **Chi-square =22**

As shown in Figure 6, 38 (45.2%) women out of 84 of the diabetic group had a history of repeated abortions twice or more, where 29 (17.3%) women out of 168 of the control group had the same history. Repeated abortions appear more prevalent among diabetic group. There is statistical significant relationship between DM and number of abortions. This means those women with DM are likely to be more exposed to abortions than other women by 4 times.

Table 17, Figure 7 & 8 illustrate that 27 women out of 60 (45.0 %) women of GDM reported repeated abortions twice or more, while 29 out of 168 (17.3%) women of the control group reported repeated abortions. The number of women who had previous history of two or more abortions was higher among GDM group than the control group women. The differences between the two groups were statistically significant.

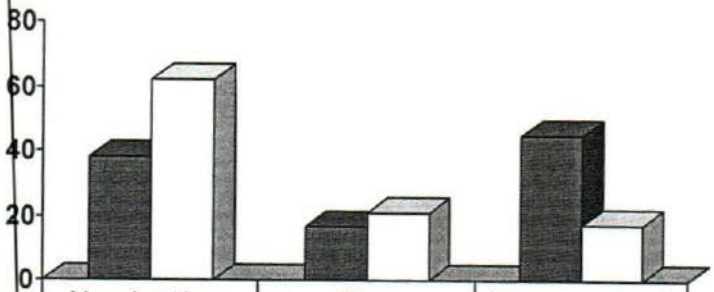
Table 17 Distribution of reported abortion among GDM subgroup and control group

Risk factor order	GDM group		Control group		Total	
	No.	%	No.	%	No.	%
Two or more*	27	45.0	29	17.3	56	24.6
Non or one abortion	33	55.0	139	82.7	172	75.4
Total	**60**	**100**	**168**	**100**	**228**	**100**

** Repeated abortions*

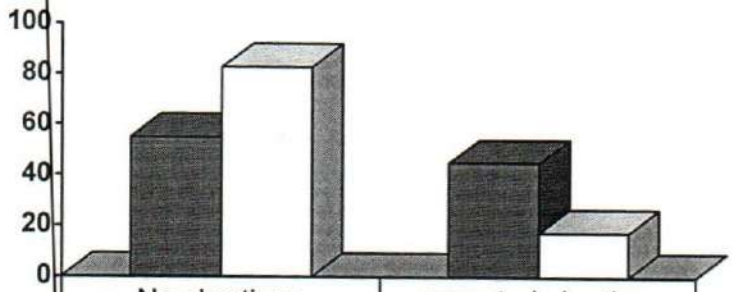
Odds ratio = 3.97 **P-value = 0.000** **Chi-square = 18.4**

There was strong association between women who had GDM and the exposure to repeated abortions. Table 17 shows that women with GDM are more likely to be exposed to abortions than control women.



	No abortions	One	Two or more*
GDM group	38.3	16.7	45
Control group	61.9	20.8	17.3

Figure 7 Distribution of reported abortion among GDM and control groups



	No abortions	repeated abortion
GDM group	55	45
Control group	82.7	17.3

Figure 8 Distribution of reported abortion among GDM and control groups

4.5.2 Stillbirths

The total number of women who had previous history of stillbirths in this study was 35, which equals 13.9% out of the total study population, while 217 (86.1%) of the total study population were women who did not report any history of stillbirths. Twenty six (10.3%) reported previous history of one stillbirth, 16 (61.5%) women of them registered DM with pregnancy while 15 (25.0%) women registered as GDM, which indicates that stillbirths are one of the complications

associated DM with pregnancy. Out of diabetic group 9 (3.6%) women reported two or more previous history of stillbirths, while 6 women of them are registered as GDM. This may indicate the rate of undetectable GDM and hence untreatable in the previous pregnancies. It was observed that women who reported previous history of stillbirths were 25 women (29.8%) of the diabetic group and 10 women (6.0%) out of 35 of control group. There were statistically differences between the two groups and history of reported stillbirths as shown in Table 18.

Table 18 Distribution of reported stillbirths among diabetic and control groups

Reported stillbirths	DM group No.	%	Control group No.	%	Total No.	%
Yes	25	29.8	10	6.0	35	13.9
No	59	70.2	158	94.0	217	86.1
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio =6.69 **P-value = 0.000** **Chi- square = 27.54**

Table 19 Distribution of reported stillbirths among GDM and control groups

Reported stillbirths	GDM group No.	%	Control group No.	%	Total No.	%
Yes	21	35.0	10	6.0	31	13.6
No	39	65.0	158	94.0	197	86.4
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 8.5 **P - value = 0.000** **Chi-square = 31.8**

In focusing, the differences between the GDM subgroup and control group by history of previous reported stillbirths were highly statistically significant and the

association is increasing. This suggests that women with GDM are more likely to be exposed to previous history of stillbirths more than control group. The findings are in Table 19.

4.5.3 Previous History of Delivery Babies with Low Birth Weight

It was observed that 56 women (22.2%) of the total study population had previous history of delivered low birth weight babies, out of them 20 women (37.7%) constituted 23.8% of the DM group. The differences between the two groups by previous history of low birth weight reached the level of statistical significance. This indicates that low birth weight is a multi factorial issue.

Table 20 Distribution of babies delivered with low birth weight

Low birth weight ≤ 2499 grams	DM group No.	%	Control group No.	%	Total No.	%
Yes	20	23.8	16	9.5	36	14.3
No	64	76.2	152	90.5	216	85.7
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 2.97 **P-value = 0.002** **Chi-square = 9.33**

Table 21 Distribution of babies delivered with low birth weight among GDM subgroup and control group

Low birth weight ≤ 2499 grams	GDM group No.	%	Control group No.	%	Total No.	%
Yes	11	18.3	16	9.5	27	11.8
No	49	81.7	152	90.5	201	88.2
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 2.13 **P-value = 0.06** **Chi-square = 3.29**

The results show statistical significant difference between the control group and GDM subgroup and history of exposure to delivered low birth weight babies, which explain that women with GDM have an increased chance to deliver LBW babies than the women without GDM. Shown in Table 21.

4.5.4 Macrosomia

It was observed that 73 women (29%) of the total study population had a history of macrosomia, out of which 46 women (63.0%) were diabetics, this number equals to 54.8% of the diabetic group in comparison to 27 women (16. 1%) were among the control group. The differences between the two groups was highly statistically significant as exposure to deliver macrosomia as shown in Table 22.

Table 22 Distribution of babies delivered with macrosomia among study groups

Macrosomia ≥ 4000 grams	DM group		Control group		Total	
	No.	%	No.	%	No.	%
Yes	46	54.8	27	16.1	73	29.0
No	38	45.2	141	83.9	179	71.0
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 6.38 **P-value = 0.000** **Chi-square = 40.74**

In specific, 30 women (50.0%) out of 60 in the GDM subgroup had reported a history of delivered macrosomia babies while 16% of the control group reported that. This means that the relationship is highly statistically significant. Women with GDM have more chance to deliver macrocosmic babies than the women without GDM (Table 23).

Table 23 Distribution of babies delivered with macrosomia among control group and GDM subgroup

Macrosomia ≥ 4000 grams	GDM group No.	%	Control group No.	%	Total No.	%
Yes	30	50.0	27	16.1	57	25.0
No	30	50.0	141	83.9	171	75.0
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 5.27 **P-value = 0.000** **Chi-square = 27.14**

4.5.5 Summary of Distribution of Undesired Outcome (Indicators)

The considered undesired outcome was tested among the studied groups as shown in Table 24 & 25. The findings showed that history of stillbirths, repeated abortion (two or more abortions), history of delivered macrosomia babies and history of delivered low birth weight babies were found statistically significant as indicators of undesired outcome of pregnancy which are associated with DM in general and GDM specifically. It is clear that:

- Pregnant women who had stillbirths were exposed to the effect of DM and GDM specifically more than women without history of stillbirths by 6.69 and 8.5 times respectively.
- Women with repeated abortions were exposed to DM and or GDM by 3.97 and 5.86 times more than pregnant women without a history of repeated abortions respectively.
- Women delivered macrosomia babies were exposed to DM or GDM by 6.38 or 5.27 times respectively more than pregnant women without similar history.

- Pregnant women who delivered LBW babies were exposed to DM, GDM by 2.97, 2.13 times more than pregnant women without similar history.

Table 24 Distribution history of undesired outcome of previous pregnancies among study groups

Undesired outcome	DM group No.	%	Control group No.	%	Odds ratio	P-value
Macrosomia	46	54.8	27	16.1	6.38	0.000
Repeated abortions	38	45.0	29	17.3	3.97	0.000
Low births weight	21	25.0	35	20.8	2.97	0.002
Stillbirths	25	29.8	10	6.0	6.69	0.000

Table 25 Distribution of undesired outcome of pregnancy among study groups

Undesired outcome	GDM group No.	%	Control group No.	%	Odds ratio	P-value
Macrosomia	30	50.0	27	16.1	5.27	0.00
Repeated abortions	27	45.0	29	17.3	5.86	0.00
Low births weight	15	18.3	16	9.5	2.13	0.06
Stillbirths	21	35.0	10	6.0	8.5	0.00

It was observed that delivered macrosomia was the highest frequency followed by repeated abortions in diabetics and GDM subgroup respectively. This explains the strong association between DM in general, GDM specifically and their exposure to these indicators.

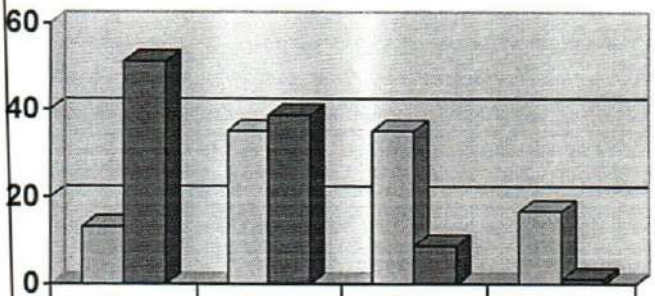
4.5.6 Indicators for Diabetes with Pregnancy

By quantification of these indicators as prediction of occurrence of DM and GDM compared to control group, as shown in Table 26 & Figure 9. It is

obvious that the number of women exposed to two or three of these indicators was higher among diabetics, GDM subgroup specifically compared to the control group. This indicates the strong association between these indicators as historical risk factors and exposure or prediction to have DM or GDM.

Table 26 Quantification the history of undesired outcome of pregnancy by women groups

Outcome indicators	DM group No.	%	Control group No.	%	Total No.	%
No indicator	12	14.3	86	51.2	98	38.9
One indicator	29	34.5	65	38.7	94	37.3
Two indicators	29	34.5	15	8.9	44	17.5
Three indicators	13	15.5	2	1.2	15	6.0
Four indicators	1	1.2	0	00	1	0.4
Total	**84**	**100**	**168**	**100**	**252**	**100**



	No indicator	One indicator	Two indicators	Three indicators
GDM group	13.3	35	35	16.7
control group	51.2	38.7	8.9	1.2

Figure 9 Quantification history of undesired outcome of pregnancy among GDM and control group

4.6 Previous Pregnancy Conditions

The full set of results for previous pregnancies for the studied groups is presented in Table 27, the following points are the most notable aspects of previous conditions associated DM with pregnancy:

(i) It was observed that the mean number of alive children for the interviewed women is 4.9 children, SD. 2.5, the mean of number of parity 5.3 and SD 2.8, and the mean number of gravida order 6.4 and SD 3.4. Registered pregnant diabetics are reported to have more alive children than the control group. This indicates high parity and gravida orders among the registered pregnant diabetics.

(ii) The mean number of lost pregnancies among the interviewed women was found 1.0. The results show 135 women (53.6%) did not report any lost pregnancy in the past. Out of the remaining 36 women (61.9%) of diabetic group compared to 65 (38.7%) of control group reported lost pregnancies, the differences were statistically significant. Out of the remaining 51 (20.2%) reported one lost pregnancy among their previous pregnancies, 66 (26.2%) reported two and or more lost pregnancies.

(iii) Regarding the number of neonatal deaths (cumulative), 40 women (15.9%) of the total study population, reported one of their infants died at neonatal age (≤ 28 days), out of them 25 (62.5%) were women registered as DM with pregnancy, 17 (68.0%) of them are registered as GDM. This indicates a statistical relationship between the control group and women registered as DM with pregnancy and the exposure of their infants to neonatal deaths.

(iv) It is seen in Table 27 that the mean number of dead children for interviewed women was found to be 0.4 child. 183 women (72.6%) of the total population did not report any child death between their children, 45 (53.6%) of them among diabetic group while 39 (46.4%) of diabetic women reported a history of children death compared to 30 (17.9%) of the control group. Forty-four women (17.5%) of the total study population reported one child death while 25 (9.9%) reported two or more children deaths.

(v) Cesarean section (CS) can be predicted as an association of DM and GDM specifically. From the study results 38 women (15.1%) reported a pervious history of CS, out of them 22 (57.9%) were diabetics. This number equals 26.2 % of the total diabetic group including (16.7%) GDM cases. These in comparison to control group where only (9.5%) were exposed to CS. This is more likely due to GDM as underlying risk factor. The differences are statistically significant between the two groups in terms of exposure to CS. This means, pregnant women with DM are more likely to be exposed to CS by 2.8 fold more than others (Table 27).

Table 27 Health status of previous pregnancies of the total study population

	DM Group		Control Group		P-value	Odds ratio
	No.	%	No.	%		
No. of Alive Children						
≤ 5 children	36	42.9	123	73.2	0.000	3.64
≥ 6 children	48	57.1	45	26.8		
Lost Pregnancy						
Yes	52	61.9	65	38.7	0.000	2.58
No	32	38.1	103	77.4		
No. of neonatal deaths (Cummulative)						
Yes	25	29.1	15	8.9	0.000	4.66
No	59	70.2	153	91.1		
Children Deaths						
Yes	39	46.4	30	17.9	0.000	3.99
No	45	53.6	138	82.1		
Previous of C.S.						
Yes	22	26.2	16	9.5	0.000	2.8
No	62	73.8	152	90.5		
Total	**84**	**100**	**168**	**100**		

4.7 Health Problems and Pregnancy Care During Last Pregnancy

This study shows that 68 women (81.0%) of the total study population had desired outcome, while among the control group 162 women (96.4%) had desired outcome (alive healthy newborn).

The following sub-sections deal with the effect of DM:

4.7.1 Reported Complications During the Last Pregnancy

The results show that the number of women reported one or more complications (Anemia, PIH, hemorrhage, preeclampsia, difficult labour and IUFD) during the last pregnancy was 175 (69.4%) of the total study population. It was observed that 75 (89.3%) of 84 women registered DM with pregnancy reported one or more complications during the last pregnancy compared to 100 women (59.5%) of the control group. The difference between the two groups is highly statistically significant (P-value = 0.004). There is no difference in this study regarding chance of occurrence of maternal complications during pregnancy for women with pre-gestational and GDM subgroup. The prevalence of complications among pregnant women at local community was high, although the increased prevalence rates of different risk factors associated DM (as mentioned above) among the studied women, still the detected rate of DM, GDM in this study is less than the expectation.

4.7.2 Distribution of Reported Complications Related to Pregnancy and DM

Pregnancy induced hypertension and/or preeclampsia, bleeding (pre-partum and or postpartum), IUFD and difficult labour were considered as common pregnancy complications more likely related to DM with pregnancy.

The result shows that, 79 (31.3%) of the interviewed women reported one or more of the considered mentioned complications, 44 (55.7%) of them are registered as DM with pregnancy compared to 35 women (20.8%) of control group. There is a statistical significance relationship between reported

complications and women groups. There were strong associations between women groups and the exposure to considered complication. The findings in Table 28 & Figure 10 are also in agreement with the high cumulative risk factors in this study. Table 29 shows the statistical significance of reported considered complications among the GDM subgroup compared to the control group.

Table 28 Distribution of reported complications among study groups

Reported complications	DM group No.	%	Control group No.	%	Total No.	%
Yes	44	52.4	35	20.8	79	31.3
No	40	47.6	133	79.2	173	68.7
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 4.18 **P-value = 0.000** **Chi-square = 29.5**

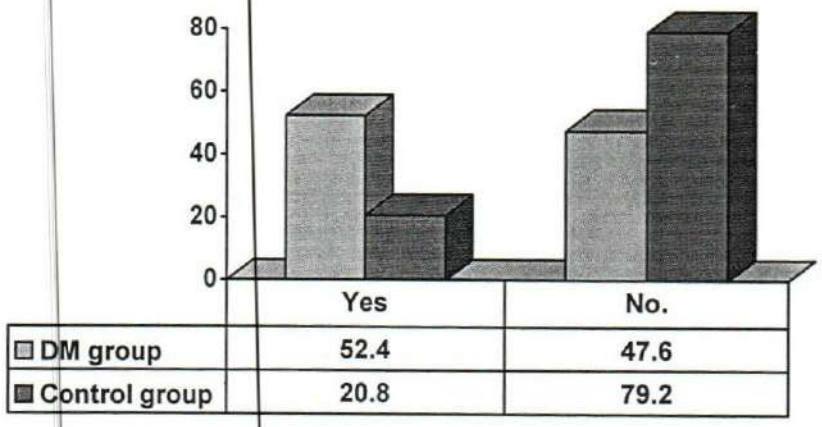


Figure 10 Distribution of reported complications among study groups

Table 29 Distribution of reported complications among GDM subgroup and control group

Reported complications	GDM group No.	%	Control group No.	%	Total No.	%
Yes	30	50.0	35	20.8	65	28.5
No	30	50.0	133	79.2	163	71.5
Total	**60**	**100**	**168**	**100**	**228**	**100**

Odds ratio = 3.8 **P-value = 0.000** **Chi-square = 18.45**

4.7.3 Distribution of Reported Hypertension and or Preeclampsia

It was focused on hypertension and/or preeclampsia as complications associating DM with pregnancy, which shows that there was strong statistically significance between hypertension and/or preeclampsia among the diabetic group compared to the control. It was observed that women with DM are at risk to develop hypertension with current pregnancy, and this relationship is more significant among pre gestational than women with GDM. Pregnant women who have hypertension with pregnancy were exposed to DM 4.08 times more than other pregnant women with hypertension. In this study 50% of women registered pre gestational DM had hypertension and 36.7% of women with GDM had hypertension. (Table 30 & Figure 11).

Table 30 Distribution of reported hypertension and or preeclampsia among study groups

Reported hypertension and preeclampsia	DM group No.	%	Control group No.	%	Total No.	%
Yes	34	40.5	24	14.3	58	23.0
No	50	59.5	144	85.7	194	77.0
Total	**84**	**100**	**168**	**100**	**252**	**100**

Odds ratio = 4.08 **P-value = 0.000** **Chi-square = 23.68**

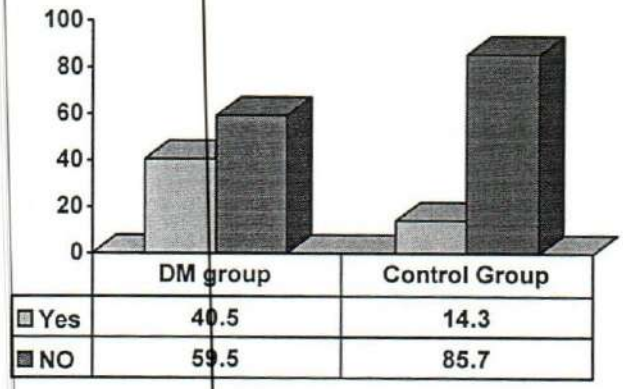


Figure 11 Distribution of reported hypertension and or preeclampsia among study groups

Quantification of Considered Reported Complications

Women who have one or two complications or presented without complications are described in Table 31. There was a statistical significant relationship between reported complications and GDM group compared to control. The findings show that the frequency of complications is more prevalent and cumulatively increased among the diabetic group in general and more prevalent among women with GDM specifically. This means that more attention and

close follow up are essential to avoid maternal complications and undesired outcome of pregnancy (Table 30 & 31).

Table 31 Quantification of different reported complications

Reported complications	GDM group No.	%	Control group No.	%	Total No.	%
No complication	30	50.0	133	79.1	163	71.5
One complication	25	41.7	31	18.5	56	24.6
Two complications	5	8.3	4	2.4	9	3.9
Total	**60**	**100**	**168**	**100**	**228**	**100**

P- value = 0.000 **Chi- square = 18.93**

4.7.4 Undesired Outcome of Last Pregnancy (Pregnancy Loss)

225 (89.3%) of the interviewed women reported delivery of alive mature healthy babies including 4 twins. Ten women (4.0%) of the total study population reported abortions out of them 7 were registered with DM which equal to 8.3% compared to 3 (1.8%) of control group. Six women (2.4%) of the total population reported stillbirths, out of them 5 of diabetics women which equals 6% compared to 0.6% of the control. Four women (1.6%) reported their infants with congenital anomalies, 3 of them are registered with DM which equal to 3.6% compared to 0.6% of the control. No premature deliveries were reported. Pregnancy loss was considered a sum of abortions, stillbirths or IUFD and congenital anomaly. It was observed that 17.9% among diabetic pregnant women were exposed to pregnancy loss while 3.6% of the control group were exposed to that. The differences between both groups in terms of exposure to pregnancy loss were statistical significant. The pregnancy loss is more liable to

be associated with pregestational DM more than GDM women, whereas 14 women (58.3%) and 7(11.7%) registered as pregestational DM and GDM respectively are exposed to undesired outcome of the last pregnancy (Table 32 & 33).

Table 32 Distribution of outcome of last pregnancy in study groups

Outcome of pregnancy	DM group		Control	
	No.	%	No.	%
Undesired outcome*	15	17.9	6	3.6
Desired outcome	69	82.1	162	96.4
Total	**84**	**100**	**168**	**100**

* Pregnancy loss

Odds ratio = 5.87 **P-value = 0.000** **Chi- square = 14.96**

Table 33 Distribution of outcome of last pregnancy among GDM group and control group

Outcome of pregnancy	GDM		Control	
	No.	%	No.	%
Undesired outcome	7	11.7	6	3.6
Desired outcome	53	88.3	162	96.4
Total	**60**	**100**	**168**	**100**

Odds ratio = 3.75 **P-value = 0.02** **Chi- square = 5.39**

4.7.5 Gestational Age and the First Antenatal Visit

The study result showed that 69 women (27.4%) of the total study population reported their first antenatal visit at ≤ 12 weeks gestation, 36 (42.9%) of them in diabetic group. Fifty seven percent of diabetic group reported their first antenatal visit after 12 weeks and more, out of them 8.3% reported their first

antenatal visit at ≥ 31 weeks gestation. The difference between the two groups and first registration is statistically significant. This indicates the late registration (booking) among diabetic group, suggesting that the late registration is associated with more complications (Table 34 & Figure 12).

Table 34 Distribution of first antenatal visit in study groups

Reported complications	DM group No.	%	Control group No.	%	Total No.	%
≤ 12 weeks	36	42.9	33	19.6	69	27.4
13 - ≤ 20 weeks	23	27.4	9	5.4	32	12.7
21 – 30 weeks	18	21.4	111	66.1	129	51.2
≥ 31 weeks	7	8.3	15	9.0	22	8.7
Total	**84**	**100**	**168**	**100**	**252**	**100**

P- value = 0.000 **Chi- square = 45**

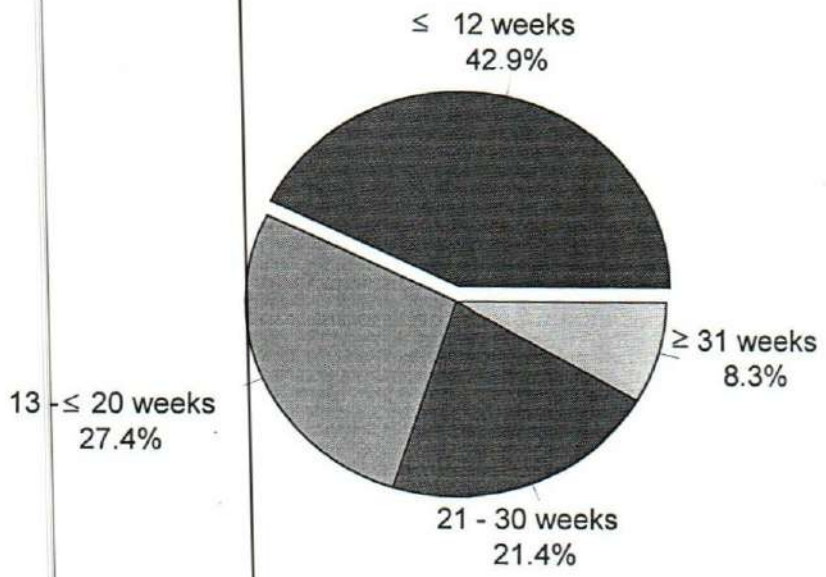


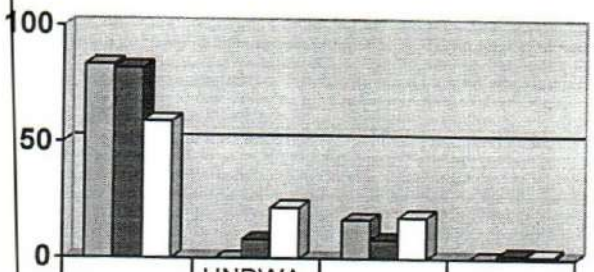
Figure 12 Distribution of first antenatal visit among diabetic group

4.7.6 Place of Delivery

The study findings are shown in Table 35 & Figure 13, describe and illustrate that 168 women (66.7%) of the interviewed women mentioned hospital delivery for the last pregnancy, out of whom 69 women (82.1%) were of diabetic group. Of diabetic group 49 women (81.7%) were GDM. Among the diabetic group there was 9 (10.7%) pregnant women who delivered at private sector although the private sector is known to lack emergency equipment. One woman (1.79%) delivered at home who was a GDM case as she was used to deliver at home. Five (8.3%) women registered with GDM delivered at UNRWA maternity wards although MoH services implemented early booking for hospital delivery system for all at high-risk pregnancy.

Table 35 Distribution of place of delivery in last pregnancy

Place of delivery	DM group		Control group		Total	
	No.	%	No.	%	No.	%
Hospital	69	82.1	99	58.9	168	66.7
UNRWA Maternity	5	6.0	37	22.0	42	16.7
Private	9	10.7	30	17.9	39	15.5
Home	1	1.2	2	1.2	3	1.2
Total	**84**	**100**	**168**	**100**	**252**	**100**



	Hospital	UNRWA Maternity	Private	Home
pre GDM	83.3	0	16.7	0
GDM	81.7	8.3	8.3	1.7
Control	58.9	22	17.9	1.2

Figure 13 Distribution of place of delivery in last pregnancy in total study population

4.7.7 Baby Birth Weight

Baby birth weight (BBW) stratified and investigated according to WHO criteria, normal BBW ≥ 2500 ≤ 3999 grams, LBW ≤ 2499 gram and Macrosomia ≥ 4000 grams was investigated.

Table 36 describes the last baby birth weight between diabetic and control group, while Figure 14, 15 & 16 illustrate the distribution of last baby birth weight of diabetic and control group. The study shows that the relationship between DM with pregnancy and LBW is highly statistically significant and has strong association, Odds ratio =2.97, Chi-square 9.33, P-value = 0.002. It was shown also in Table 36 that the relationship between DM during pregnancy and delivery macrosomia babies was statistically significant, Odds ratio = 3.32, Chi-square 14.84, P-value = 0.000. This explains that DM with pregnancy is strong attributable risk factor to exposing women to deliver LBW or macrosomia babies by 2.97, 3.32 respectively.

Table 36 Distribution of last baby birth weight among diabetic women and control group

Baby birth weight of last delivery	DM group No.	%	Control No.	%	Total	
BBW ≤ 2499 gram	20	23.8	16	9.5	36	14.3
BBW ≥ 2500 ≤ 3999 grams	35	41.7	129	76.8	164	65.1
Macrosomia ≥ 4000 grams	29	35.5	23	13.7	52	20.6
Total	**84**	**100**	**168**	**100**	**252**	**100**

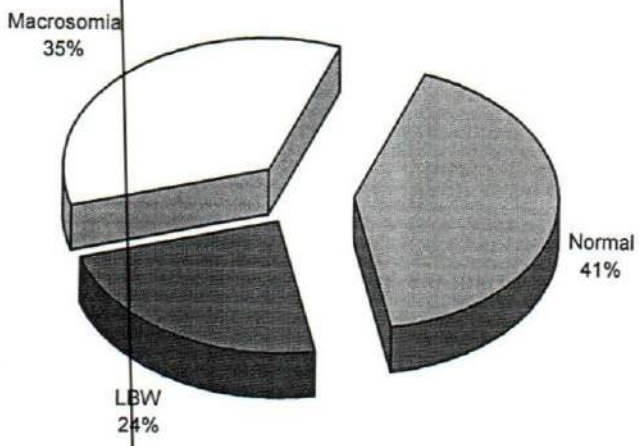


Figure 14 Distribution of last baby birth weights among diabetic women

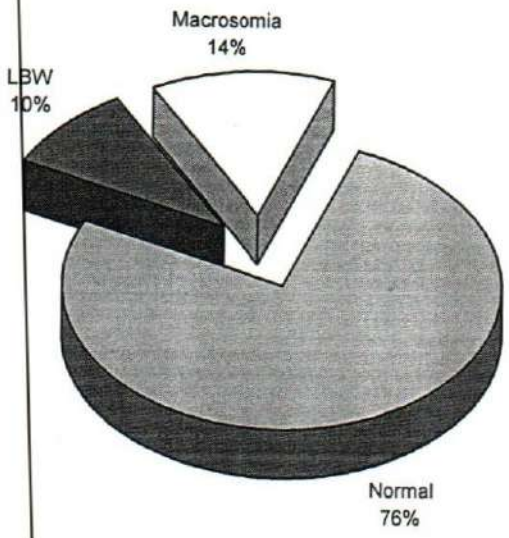
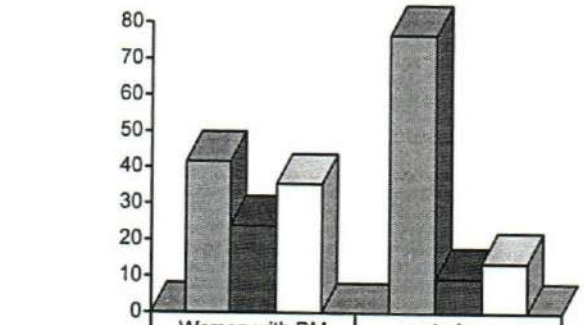


Figure 15 Distribution of last baby birth weights among control group women



	Women with DM	control group
Normal	41.7	76.8
LBW	23.8	9.5
Macrosomia	35.5	13.7

Figure 16 Distribution of last baby birth weights among study groups

4.7.8 Treatment of DM with Pregnancy

The present study focused on the treatment taken and babies birth weight. Out of 84, 37 (44.0%) of diabetic women did not report insulin treatment for their DM condition. Thirty one (51.7%) of women registered as GDM were on diet treatment, while 29 GDM women (48.3%) were treated by insulin. Eighteen women 75.0% of pregestational diabetes out of 24 were under treatment by insulin (Table 37).

Table 37 Treatment of diabetic women with pregnancy

Treatment type	Pre-GDM		GDM		Total	
	No.	%	No.	%	No.	%
Diet	6	25	31	51.7	37	44.0
Insulin	18	75.0	29	48.3	47	56.0
Total	**24**	**100**	**60**	**100**	**84**	**100**

The result findings showed that statistical significant relationship between LBW birth weight ≥ 2500 grams and insulin treatment (Table 38 & Figure17). The difference reached a statistical significant between macrosomia birth weight ≥ 4000 grams and insulin treatment. This explains that insulin intake, as treatment of DM condition is more likely to protect women from having LBW or macrosomia babies 3, 0.32 times respectively (Table 38 & Figure 17).

Table 38 The treatment taken and low babies birth weight among diabetic group

Treatment type		BW ≤ 2499 grams No.	%	BW ≥ 2500 grams No.	%
Insulin		15	75.0	32	50.0
No insulin		5	25.0	32	50.0
Total		**20**	**100**	**64**	**100**

Odds ratio = 3 **P-value = 0.049** **Chi-square = 3.9**

Table 39 *The treatment taken and macrosomia babies birth weight among diabetic group*

Treatment type		BW ≥ 4000 grams No.	%	BW < 4000 grams No.	%
Insulin		11	37.9	36	66.4
No insulin		18	62.1	19	33.6
Total		**29**	**100**	**55**	**100**

Odds ratio = 0.32 **P-value = 0.015** **Chi-square = 5.84**

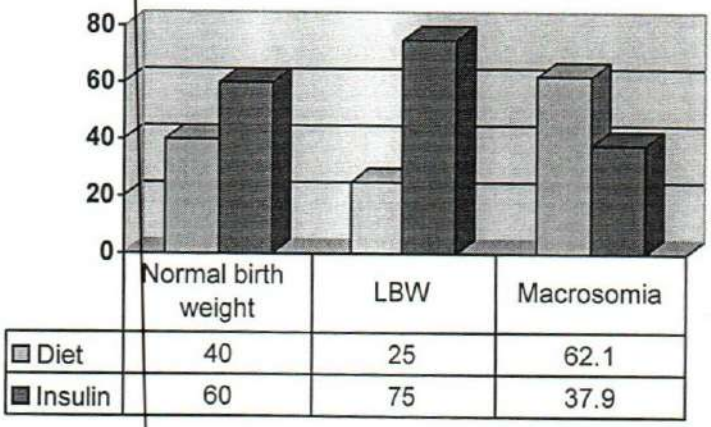


Figure 17 Relation between the treatment taken and babies birth weight among diabetic group

4.7.9 Blood Glucose Testing

MoH presented 71.4% diabetic women were tested for blood glucose and 25% for control group in their last pregnancy. In UNRWA blood glucose was tested for 94.3% of diabetic group and 88.9% for control group as shown in Table 40.

4.7.9.1 Number of Blood Glucose Testing

The study findings showed that 8 women (9.5%) of diabetic group and 34 (20.2%) of control group did not report any blood glucose testing documented on their maternity health records. Twenty women (14.3%) of diabetic group and 117 women (69.6%) of the control group reported blood glucose testing once while 64 women (76.2%) of diabetic group and 17 (10.1%) of control group reported two or more times blood glucose testing.

4.7.9.2 Gestational Age and the First Blood Glucose Test

Figure 18 illustrate that 36 women (42.9%) of the total diabetic women in the last pregnancy reported first blood glucose test at gestational age ≤ 12 weeks. Out of 84 women, 48 (57.1%) reported first BGT after 12 weeks, 23 women (27.4%) of them reported at 13-20 weeks gestation, 18 (21.4%) reported first BGT at gestational age 21-23 weeks, and 7 (8.3%) reported first BGT at gestational age ≥ 31 weeks.

Table 41 Distribution of historical risk factors among study groups

Historical risk factors	DM Group		Control Group		P-value	Odds ratio
	No.	%	No.	%		
Past history of family history of DM	61	72.6	67	39.9	0.000	4
Past history of GDM	49	81.7	0	0.00	0.000	undefined
Age of women ≥ 31	72	85.7	71	42.3	0.000	8.2
Obesity (BMI ≥ 27)	68	80.9	88	52.4	0.000	3.86
Parity order ≥ 6	59	70.2	47	28.0	0.000	6.08
Reported considered complication	44	52.4	35	20.8	0.000	4.18
Hypertention and or preclamsia	34	40.5	24	14.3	0.000	4.08
Repeated abortion	38	45.2	29	17.3	0.000	3.97
History of stilbirths (IUFD)	25	29.8	10	6.0	0.000	6.69
History of congenital anomaly	6	7.1	1	0.6	0.002	12.85
Macrosomia (previous infant with more than 4 kg)	46	54.8	27	16.1	0.000	6.38

4.9 The Risk Assessment of Pregnancy According to Reported Data in the Maternal Health Records

The assessment for risk factors and complications are ongoing process through pregnancy. Two hundred forty nine (98.8%) of the maternal health records had full risk assessment data. Table 42 & Figure 19 describe and illustrate the distribution of risk assessment by health workers. It illustrated that parity order of ≥ 6 is the highest distribution factor (39.0%), the second factor was the age ≥ 35 (37.3%), the third distribution factor was DM with pregnancy (33.7%), while the lowest risk factor was bleeding related to pregnancy (6. 8%).

Table 42 Distribution of different risk factors reported on maternal health records (MHR) among study population

Risk factors	Frequency No.	%	Women DM No.	%	Control No.	%
Para ≥ 6	97	39.0	63	75	34	20.6
Age ≥ 35	93	37.3	35	41.7	113	68.5
DM with pregnancy	84	33.7	84	100	00	00
Hypertension	47	18.9	28	33.3	19	11.5
Habitual abortion ≥3	41	16.5	28	33.3	13	7.9
Perinatal deaths ≥ 2	38	15.3	30	35.7	8	4.8
Previous preeclampsia	31	12.4	18	21.4	13	7.9
Bleeding related to pregnancy	17	6.8	11	13.1	6	3.6
Anemia severe ≤ 9 grams	22	8.8	7	8.3	15	9.1

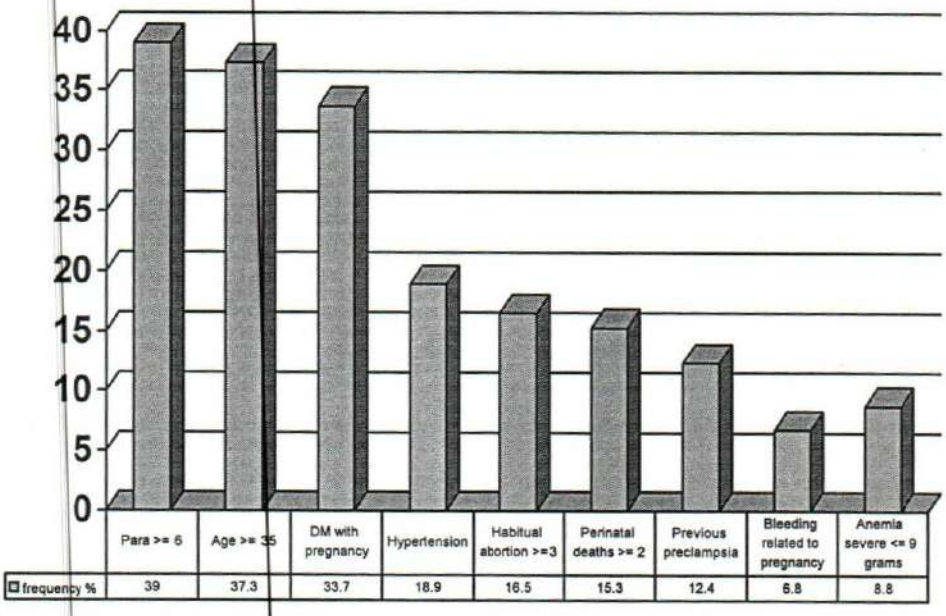
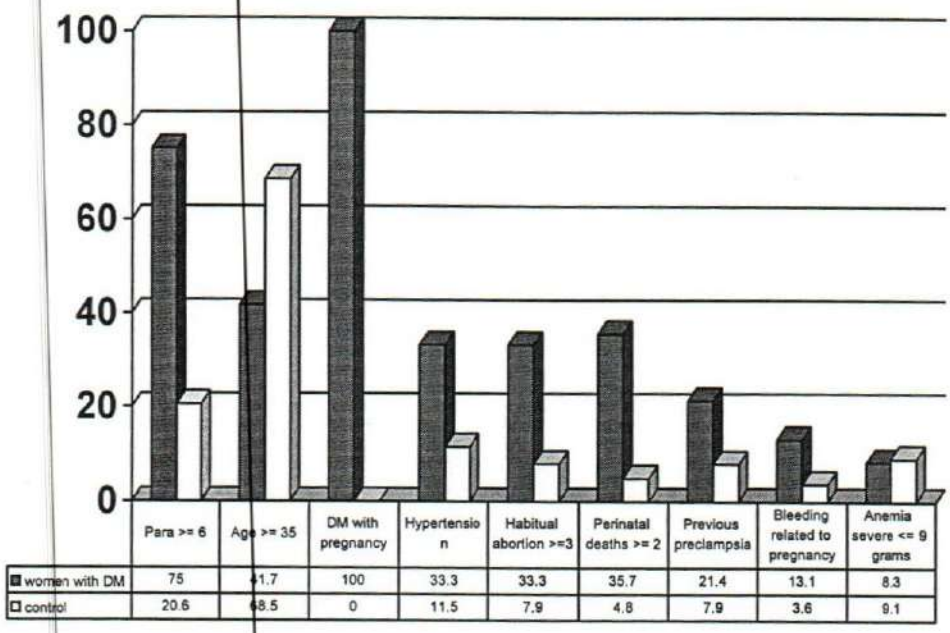


Figure 19 Distribution of different risk factors reported on maternal health records of study population

4.9.1 Maternal Health Records by Service Providers

In MoH Pregnant women are classified into 3 groups according to a risk assessment score: low, medium and high risk. UNRWA classifies them as normal (no risk), alert and high risk. The study showed the rates of risk assessment by health workers on MHRs were different between MoH and UNRWA i.e. DM with pregnancy reported 44.7% in MoH compared to 35.5% at UNRWA, i.e. Age risk assessment was reported 42.1% in MoH compared to 37.9% at UNRWA. But the differences did not reach the statistical significance level (Table 43).



	Para >= 6	Age >= 35	DM with pregnancy	Hypertension	Habitual abortion >=3	Perinatal deaths >= 2	Previous preclampsia	Bleeding related to pregnancy	Anemia severe <= 9 grams
■ women with DM	75	41.7	100	33.3	33.3	35.7	21.4	13.1	8.3
□ control	20.6	68.5	0	11.5	7.9	4.8	7.9	3.6	9.1

Figure 20 Distribution of different risk factors reported on maternal health records

Table 43 Distribution of different risk factors reported on maternal health records (MHRs) by health service providers

Risk factors	Frequency No.	%	MoH No.	%	UNRWA No.	%
Para ≥ 6	97	39.0	16	42.1	81	37.9
Age ≥ 35	93	37.3	17	44.7	76	35.5
DM with pregnancy	84	33.7	14	36.8	70	32.7
Hypertension	47	18.9	8	21.1	39	18.2
Habitual abortion ≥3	41	16.5	5	13.2	36	16.8
Perinatal deaths ≥ 2	38	15.3	7	18.4	31	14.5
Previous preeclampsia	31	12.4	6	15.8	25	11.7
Bleeding related to pregnancy	17	6.8	1	26.3	16	7.5
Anemia severe ≤ 9 grams	22	8.8	00	00	22	10.3

P- value = 0.9 Chi -square = 1.8

It is clear that the frequency of risk factors is cumulative in diabetic group than in the control. Women with diabetes during pregnancy reported at their maternity record as the highest risk order, followed by para ≥ 6 (75.0%) compared to (20.6%) of the control. The age of ≥ 35 year old was the highest cumulative risk factor among the control group, which equal to 66.5% old as the health workers reported that are shown in Figure 20.

The risk factors to be considered during evaluation are bad obstetric history, (habitual abortions, prenatal deaths, previous preeclampsia, bleeding related to pregnancy and previous cesarean section) hypertension with pregnancy, parity order ≥ 6 and age ≥ 35 years and DM with pregnancy as reported by health workers. The study results showed that pregnant women with DM during

pregnancy reported bad obstetric history more than other pregnant women, and reported more cumulative rate of bad obstetric history indicators. Fifty-nine women (70.2%) of diabetics compared to 21.2% of control reported bad obstetric history (Table 44). The differences between the diabetic group and the control group by the reported risk factors are statistically significant, suggesting that pregnant women with DM need more close observation, frequent evaluation and proper medical care to avoid the fetal and maternal complications and decrease the high frequency of undesired outcome of pregnancy.

Table 44 Distribution of bad obstetric history among study population

Bad obstetric history order	DM group No.	%	Control group No.	%	Total No.	%
No bad obstetric history	25	29.8	130	78.8	155	62.2
One factor	35	41.7	22	13.3	57	22.9
Two factors	14	16.7	7	4.2	21	8.4
Three factors	8	9.5	5	3.1	13	5.3
Four factors	2	2.4	1	0.6	3	1.2
total	**84**	**100**	**165**	**100**	**249**	**100**

P- value = 0.000 **Chi -square = 57.15**

4.10 Knowledge of Women

4.10.1 Knowledge of the Study Population on Health Events Lead to Risk Pregnancy

Figure 21 & 22 illustrate the knowledge regarding health events leading to risky pregnancy. Two hundred forty nine women (98.8%) gave their opinions

concerning the common health events that lead to risky pregnancy. The interviewed women considered hypertension and diabetes with pregnancy as the most common health events that make the pregnancy at high risk, and this is very close to the reality. Age younger than 18 years and older than 34 years considered by 60.4% of the interviewed women as age of risky pregnancy which reflects the lack of knowledge and awareness of women regarding the importance to avoid pregnancy at these ages. Approximately 64.9 % of the interviewed women mentioned 1- 4 of the above mentioned health events as causes of risky pregnancy. While 52.5% of the interviewed women mentioned economic situation, malnutrition, poverty, social problems, massive increase of body weight during pregnancy and short birth intervals as contributing events leading to high risk pregnancy. Figure (22) illustrates the knowledge of both groups, the diabetic group considered DM with pregnancy and hypertension are the most common risk factors (98.8% and 92.7% respectively). This indicates that the knowledge of women in general needs more effort through comprehensive health education and counseling through antenatal health services.

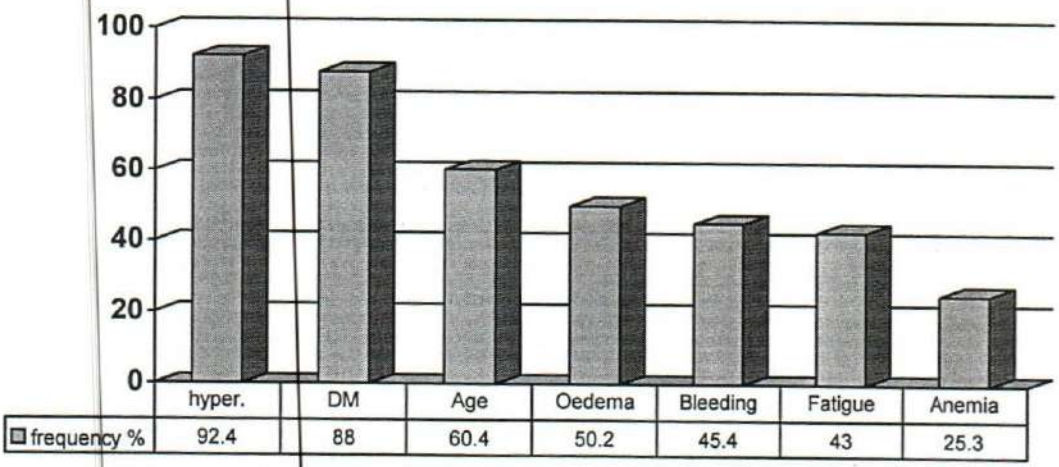
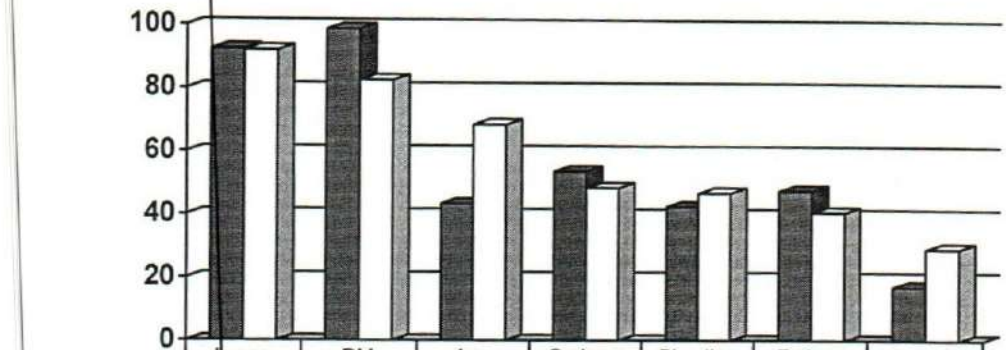


Figure 21 Knowledge of women on health events leading to risky pregnancy



	hyper.	DM	Age	Oedema	Bleeding	Fatigue	Anemia
women with DM	92.7	98.8	43.5	53.7	42.7	47.6	17.1
control	92.2	82.6	68.5	48.5	46.8	40.7	29.3

Figure 22 Knowledge of women on health events leading to risky pregnancy

4.10.2 Knowledge on Symptoms of Diabetes

The study showed that 210 women (83.3%) of the total study population answered positively regarding question about previous knowledge (hearing) about GDM. The majority mentioned fatigue (62.7%), drowsiness (58.3%), polyuria (55.6%) as symptoms for DM in pregnancy. Whereas 35.3% of women mentioned that DM with pregnancy will disappear after delivery (Table 45).

Table 45 The distribution of different symptoms of DM with pregnancy mentioned by study groups

Symptoms of DM with pregnancy	Frequency No.	%	MoH No.	%	UNRWA No.	%
Fatigue	158	62.7	26	68.4	132	54.8
Drowsiness	147	58.3	25	65.8	122	57.0
Polyuria	140	55.6	22	57.9	118	55.1
Thirst	139	55.2	22	57.9	117	54.7
Polyphagia	127	50.4	19	50.0	108	50.5
Increase body weight	101	40.1	16	42.1	85	39.7

P- value = 0.83 **Chi- square = 2.14**

4.10.3 Knowledge on Maternal Complications Associated DM with Pregnancy

The study showed that 26.6% of interviewed women mentioned other maternal complications like persistent DM after delivery, recurrent infections, e.g. myocotic infection, and urinary tract infections. Out of them 10.0% of the interviewed women mentioned DM with pregnancy to be more costly due to more investigations, repeated antenatal visit, hospitalization, having negative social impact and may be lead to secondary infertility (Table 46). While 9.9% of women registered with DM did not mention any of the well-known maternal complications liable to occur among pregnant women with DM compared to 23.9% of control group. While 22 women (25.9%) of diabetic group mentioned two complications compared to 20.2% of the control group and 22.2% of the diabetics mentioned three complications compared to 15.5% of the control group (Table 47). This indicates lack of knowledge of women and awareness of women among the diabetic group. This suggests the need for community health education.

Table 46 ***Knowledge of the study population regarding the maternal complications associated DM with pregnancy***

Maternal complications	Frequency	
	No.	%
Obstructed labour	142	56.3
Bleeding	58	23.0
Premature labour	46	18.3
abortion	44	17.5
Maternal death	25	9.9
Other complications	67	26.6

Table 47 Knowledge of the women regarding the maternal complications associated DM with pregnancy

Maternal complications	Total		Dm group		Control group	
	No.	%	No.	%	No.	%
No complications	48	19.1	8	9.9	40	23.8
One complication	61	24.2	16	18.5	45	26.8
Two complications	56	22.3	22	25.9	34	20.2
Three complications	45	17.7	19	22.2	26	15.5
Four complications	20	7.9	7	8.6	13	7.7
Five complications	18	7.4	11	13.6	7	4.2
Sex complications	4	1.4	1	1.2	3	1.8
Total	**252**	**100**	**84**	**100**	**168**	**100**

P- value = 0.011 **Chi -square = 16.45**

4.10.4 Knowledge on Fetal Complications Associated DM with Pregnancy

It is clear that 7.4% of women registered with DM did not mention any of the well-known fetal complications liable to occur among pregnant women with DM, compared to 24.4% of the control group. Twenty-three women (27.2%) of the diabetic group mentioned two complications compared to 26 (15.5%) of the control group, while 11 (13.6%) of diabetics mentioned three complications compared to 31 (18.5%) of the control group. Twenty-nine (34.5%) of the diabetic group mentioned more than four complications compared to 44 (26.2%) of the control group (Table 49). This indicates that there is a lack of knowledge on risk events with pregnancy, symptoms, maternal and fetal complications of diabetes with pregnancy. This suggests a call for early detection and prevention for safe pregnancy, desired outcome and safe motherhood.

Table 48 Knowledge of the study population on fetal complications associated DM with pregnancy

Fetal complications	Frequency	
	No.	%
Macrosmia	122	48.4
IUFD	111	44.0
Congenital anomaly	75	29.8
Infants deaths	63	25.0
Premature baby	56	22.2
LBW baby	52	20.6
Abortion	44	17.5

Table 49 Knowledge of the women regarding the fetal complications associated DM with pregnancy

Fetal complications	Total		DM group		Control group	
	No.	%	No.	%	No.	%
No complications	47	18.6	6	7.4	41	24.4
One complication	41	16.4	15	17.3	26	15.5
Two complications	49	19.5	23	27.2	26	15.5
Three complications	42	16.7	11	13.6	31	18.5
Four complications	32	12.5	11	13.6	21	12.5
Five complications	22	8.9	5	6.2	17	10.1
Sex complications	13	5.1	9	11.1	4	2.4
Seven complications	6	2.3	4	3.7	2	1.2
Total	**252**	**100**	**84**	**100**	**168**	**100**

P- value = 0.000 **Chi- square = 26.09**

4.11 Degree of Satisfaction

Eighty percent of interviewed women were satisfied and comfortable with the existing antenatal and postnatal services. This reflects the major effort paid by the MoH and UNRWA facilitated by presence of PNA.

4.11.1 Reasons Why ANC was Considered Important

This is described in Table 50. It was reported by 98.4% of the total population that the antenatal care is important. The reasons mentioned were different as regards the importance of the antenatal care. Early detection of maternal child health hazard were reported as reasons by 96.0%, followed by health advises 94.0% and laboratory services as reasons by 93%.

Table 50 Reasons for importance of antenatal care

Aspects of ANC	No.	%
Early detection for women and child health	242	96.0
Advises	237	94.0
Investigation (laboratory services)	236	93.7
Relation with HP	236	93.7
Services	232	92.1
Medical supply	229	90.9
Health education	200	79.4
Home visit	88	34.9

4.11.2 Some Problems in Existing Antenatal Services as Judged by Women Opinions

Twenty percent of the interviewed women reported problems towards existing antenatal services. Out of them, 38.0% mentioned problems in waiting time, 17.3% mentioned a defect in appointment system. While 10.6% showed defects in laboratory services and delayed results for some days. Whereas 59.9% reported there were defects in diagnostic equipment (ultrasound services) which was considered by them as essential tools for the monitoring of pregnancy especially the at risk group. In addition 39.1% mentioned the shortage of qualified health professionals to give comprehensive services and to deal with high risk pregnancy at PHC level centers and 27.7% reported the importance of female health professionals availability, they mentioned which it goes with the religion, cultural and social values. Some women mentioned that the counseling with qualified health workers is less than the needs especially for at high-risk pregnant women, e.g. nutritional counseling and medication prescriptions, the psychosocial assurance and support. Some women mentioned lack of good communications between health professionals and pregnant women. Twenty five percent of the interviewed women asked for expansion of services to cover the afternoon period to serve of employed women. The majority of interviewed women asked for similar services and similar management between MoH & UNRWA PHC centers (standardization of maternal services) and to facilitate institutional delivery under qualified health staff and to be free of charge for all deliveries and should not be limited to high risk pregnancies.

A complete small study scale was carried out on health professionals regarding knowledge and practice in diabetes with pregnancy. The results were described fully in the Appendix XIII. Summary of results on health professionals knowledge are as follow:

(i) Majority of answers showed no statistical significance between primary health and secondary health care, between MoH and UNRWA PHC and duration of medical experiance. This suggests that the whole system in need for refreshment, training and guidelines.

(ii) All the health professionals, in MoH and UNRWA health care showed defect in knowledge, skills and practice and they all deal with diabetes at the same level in management irrespective to seniority.

Chapter 5
Discussion

Chapter 5

Discussion

The results of this study have identified diabetes mellitus status among pregnant women and risk factors that may be associated and enhance diabetes mellitus with pregnancy at the Southern area of Gaza Province. This study has shown the interconnection between DM and maternal morbidity, infants and children morbidity and mortality.

5.1 Estimated Prevalence of Diabetes Mellitus with Pregnancy

In our study the reported prevalence of diabetes mellitus among the study population was found to be 0.49% and 0.41% through 1999 and the first half of 2000 respectively. This gives a collective prevalence through the study "from January 1999 to end of June 2000" that equal to 0.46 %. The reported prevalence of GDM in 1999, and at first half of 2000 at Southern area was found to be 0.36 %, 0.29% respectively. The expected prevalence of GDM is about 2-5%, the prevalence may range from 1-14 % of all pregnancies, depending on the population studied, the diagnostic criteria employed and the difference in methodology (ADA, 2000). The expected prevalence of diabetes with pregnancy in the local community is more than 2% (UNRWA, 1999). The community suffer from high prevalence of different risk factors associated and enhancing diabetes with pregnancy e.g. obesity, sedentary lifestyle, stress, strong family history of DM, consanguineous marriage, dieting practices, age of women and high parity. Although the study prevalence rate of diabetes with pregnancy in general and GDM specifically was found to be lower than those

reported by other authors, Jawad and Irshaduddin, 1996; Bartha et al, 2000; Griffin et al, 2000. It is difficult to explain why the decrease in the prevalence of diabetes with pregnancy happened. It may be due to diabetes is a disorder of multifactorial etiology which is in favour with Hollinsgrowth, 1994; ADA, 1997. The primary concern is with what happens to individual pregnant women in order to plan and implement policies for detection of the real magnitude of the problem and the real prevalence rate of DM in general and GDM specifically. Our findings showed that MoH (PHC) centers reported prevalence of DM with pregnancy was 0.27%, 0.28 % and 0.15%, 0.17% for GDM in 1999 and at the first half of 2000 respectively. UNRWA (PHC) centers findings reported prevalence of DM with pregnancy which was found to be 0.52 % and 0.47% through 1999 and at first half of 2000 respectively and 0.44% and 0.34% for GDM in 1999 and at the first half of 2000 respectively. The findings of UNRWA are higher than those of the MoH but still below the expectation, could it be due to the variation in diagnostic criteria, or due to under reporting which suggest a computerized registry program for diabetic pregnant women or other undefined reasons. To correct the current situation of low detection rate of DM with pregnancy, a comprehensive well woman care services including proper screening for women and/ or pregnant women with one or more risk factors is needed. Also there is a need for a community based survey for pregnant women to identify the near relative prevalence of diabetes mellitus with pregnancy and the reasons behind this decrease in detection rates in Palestine.

5.2 Addressed Risk Factors Associated and Enhancing Occurrence of DM with Pregnancy

Four risk factors were investigated (women age, positive family history of DM, pre-pregnancy obesity (BMI ≥ 27) and parity order ≥ 6). They were found to be associated and enhancing occurrence of DM with pregnancy specifically GDM. Our findings showed that there is a strong statistical relationship between these risk factors in diabetic pregnant women compared to the control group (p-value 0.000). An increase of association in prediction of DM with pregnancy enhanced by these risk factors i.e. women age ≥ 31 Odds ratio=8.2, family history of diabetes odds ratio=4, BMI ≥ Odds ratio=3.86 and parity order ≥ 6 Odds ratio=6.08.

In this study, it was found 56.7% women of the total study population were in the age group ≥ 31 years old, whereas diabetic pregnant women were (85.7%) compared to 42.3% in control group fell in the age group ≥ 31 years. This presented the highest frequency order among the risk contributing factors group. This confirmed that pregnant women at the age of ≥ 31 years predicted to be exposed to DM complicating their pregnancy and GDM specifically by 8.2, 12.3 times respectively than pregnant women at the age ≤ 30 years old. This is in favour with CDC, 1999 who stated that the risk of developing Type 2 increases with age. The results suggest the need for more efforts to be paid to increase the awareness of women regarding the importance to avoid pregnancy at this age. In this study age is a confounder. The percentage of aged women among cases is higher than those among control. We did not match control for age to keep effect of age as a risk factor in this study. When the investigator fails to control for confounder by selection she has to control this during

analysis. In this stage of the study we are presenting the results as they are keeping in mind the effect of age as a confounder. Further analysis using regression analysis is required in the next stage to detect and control for confounder, such analysis will measure the interaction between different risk factors.

In our findings, the second risk factor was obesity, diabetic women of BMI ≥ 27 (80.9%) vs. (52.4%) in the control group, followed by family history of DM "First degree relationship" (72.6%) vs. (39.9%) and high parity "parity order ≥ 6" (70.2%). These findings are in agreement with those of similar studies. In Kuwait, 1997 Abdulla et al reported that 8.6% of women diagnosed to have diabetes during pregnancy showed positive family history of DM in first degree relatives, high parity index 6.5 ± 2.9 and 75.5% of diabetic women were obese (defined by BMI > 30 Kg/m2), as an associated risk factors with DM in pregnant women. In Auckland, Cundy et al, 2000 who reported high parity, older and more obese subjects with Type 2 DM were significantly more than subjects with Type 1 DM. In France, Vambergue et al, 2000 found a greater significance and when reported for risk factors for GDM in 74.3% of women with mild gestational hyperglycemia. Whereas 22% of mild gestational hyperglycemia (MGH) matched with women who had a first degree family history of diabetes and 26.9% were obese before pregnancy (defined by BMI > 27). Women with MGH were significantly older and more obese than the controls (P-value < 0.05 and < 0.01 respectively), in contradiction to our study result the findings rate of multiparty was not statistically significant between the groups (Vambergue et al, 1992).

Strong family history of diabetes mellitus was the highest addressed risk factor as prediction of GDM and accumulates in Palestinian families at study area. The advantage is that it confirms the significant role of genetics in the etiology of diabetes (90.0% vs. 42.3%). This revealed that pregnant women with a family history of diabetes are predicted to be exposed to DM and GDM specifically 4, 3.52 times respectively than women with no family history of diabetes. This is going with many studies that consider GDM undetected Type 2, or at risk to be Type 2 later in life with a strong genetic predisposition (ADA, 1997 and 2000). In accordance with Griffin, 2000, who clarified that a family history of Type 2 diabetes is the most common indication for screening in the risk factor group.

It was found 61.9% of the total study population are obese, 43.6% of them were registered diabetics pregnant women had BMI ≥ 27, which reflects obesity in women as a health problem in the local community. The epidemiological transition in developing countries including Palestine and experienced in urbanization, change the style of life, diet change and habits, high intake of carbohydrate (CHO), and sedentary socioeconomic life are enhancing obesity to become prevalent (Alwan, 1997). Our findings exposed the strong association between obesity and prediction to diabetes with pregnancy which is in favour that obesity itself causes some degree of insulin resistance, and hence developing Type 2 which increases with age, obesity and lack of physical activity (Peiris et al, 1988; CDC, 1998; ADA, 1999).

Obesity was found in the second order as risk factor among diabetic women (80.9%), (85.0%) of them in GDM subgroup, this indicates that pregnant women

with BMI ≥ 27 are predicted to be exposed to DM, GDM 3.86, 5.15 times respectively than pregnant with BMI ≤ 27. This is going with many studies considering obese women with GDM were undetected with Type 2, or at risk (powerful predictor) to develop Type 2 later in life with a strong genetic predisposition (O'Sullivan, 1995; ADA, 1999; Bartha et al 2000). Catalano, 1999 concluded that improvement of the understanding of carbohydrate metabolism in obese women with GDM may provide a basis for therapeutic strategies to prevent obstetric complications, which are significantly high among them.

Our findings revealed that pregnant women with high parity of ≥ 6 were predicted to be exposed to DM complicating their pregnancy 6 times higher than pregnant women with parity of < 6, whereas the association increases in prediction of GDM by 7.72 times. These similar risk factors in this study are in accordance with previously published work in Karachi (Jawad and Irshaduddin, 1996), Dublin (Griffen et al, 2000), Auckland (Cundy et al, 2000) and they reported subjects with GDM were significantly older, heavier pregnant, with positive family history of DM and high parity.

Our most significant findings were the association of the chance of women to have DM with pregnancy in general and GDM specifically. This was increased steadily with increased prevalence of risk factors mentioned and this increase becomes more liable to occur when there were more cumulative risk factors and higher than that in the general population (control). Therefor any of the four risk factors can be used to find the prediction of diabetes with pregnancy and GDM specifically. The author suggest that the first and most important step to achieve control of addressed risk factors and prevention the prediction of

diabetes with pregnancy in Palestinian mothers is to promote public education and awareness about diabetes mellitus with pregnancy. This can be achieved in several ways, such as publication of small booklets in Arabic, discussions and lectures on television and inclusion information about diabetes mellitus in school curriculum. Doctors and nurses can play role in health education by emphasizing the importance of dietary intake, exercise, weight control, the role of family planing, lectures can be arranged at these health centers to improve awareness. Finally, comprehensive preventive and control plan including health education, counseling, diet counseling, family planning services and social counseling is badly needed to be implemented in the local community as predictor for GDM to reduce the prevalence and the adverse effect of these different risk factors.

5.3 Socioeconomic Factors

Women education, husbands' education, husbands' occupation, women occupation, place of living (city, camp, village) are considered as indicators of socioeconomic factors in this study. No statistical significant was found with these factors as contributing risk factors for DM with pregnancy.

In contradiction to many other similar studies Type 2 is associated with low socioeconomic (Herman et al, 1997) and (Cundy et al, 2000) but Alwan, 1997 reported that there were rural/ urban differences in prevalence of DM 9.3% but up to 20% in higher socioeconomic class. Although, studies conducted show statistical significant relationships between both socioeconomic in general and diabetes mellitus with pregnancy. Women from middle and upper income groups with Type 2 diabetes may be present early for prenatal care, where

women with low income may be delayed because lack of easy access to the health care system for high- risk pregnancies (Hollingsworth, 1994).

Consanguineous marriage constitutes 57.5% of the total study population, out of them 61.9% were among diabetic group compared to 55.3% of the control group. Whereas 59.3% were first degree cousins, out of them 26.3% of gestational diabetics pregnant women compared to 73.7% of the control. In spite of these findings there was no statistical significant relationship between consanguineous marriage and the chance to have DM with pregnancy generally and GDM subgroup specifically. This result contradicts those of El-Hazmi, 1990 in Saudi Arabia who presented that, 3.36% was the effect of consanguinity on DM as health problem. According to PCBS data in 1999 consanguineous marriage is wide spread in Gaza, it constitutes 49% in Palestine and more than 47% in Gaza Province. This is going with other study conducted by EL- Kariri, 1999 which estimated the consanguineous marriage rate at 49.4%.

5.4 Undesired Outcome of previous Pregnancies as an Indicator for Occurrence of DM

Past History of repeated abortion (two or more), stillbirths, delivered macrosomia babies (baby birth weight ≥ 4 000 grams) and delivered low birth weight babies (BBW ≤ 2499 grams) were considered as undesired outcome of pregnancy. They are more likely to be associated and complicating with diabetes mellitus in general and GDM specifically (ADA, 2000). In the present study high prevalence was found of these indicators among pregnant women in study population, which urge intervention for close investigation and observation

of women with past history of one or more of these indicators. This means we can identify the undetected pregnant women with DM. These indicators were found strongly significant and associated with DM in pregnancy and GDM specifically (P-value = 0.000) in comparing to the control group, they could be summarized as follows:

a) Repeated abortions, was found statistically significant as an indicator of undesired outcome of pregnancy associated with DM in general and GDM specifically. Women with repeated abortion are exposed to DM and or GDM effect by 3.97 and 5.86 time more than pregnant without history of repeated abortions respectively (odds ratio, 3.97 and 5.86 respectively).

b) Past history of stillbirths was found statistically significant as an indicator of undesired outcome of pregnancy and associated with DM in general and GDM specifically. Pregnant women who had stillbirths were exposed to effect of DM and GDM more than women without a history of stillbirths by 6.69 and 8.5 respectively (odds ratio 6.69 and 8.5 respectively).

c) Past History of delivered macrocosmic babies were found statistically significant as an indicator of an undesired outcome of pregnancy associated with DM in general and GDM specifically. Women who delivered macrosomic babies are exposed to DM and or GDM by 6.38 and 5.27 time more than pregnant women without history of macrosomia delivery respectively (odds ratio ,6.38 and 5.27 respectively).

d) History of delivered low birth weight babies (LBW) was found statistically significant as an indicator of undesired outcome of pregnancy associated with

DM. This clarifies that LBW is multifactorial disorder. The relationship between D.M group, GDM subgroup and the chance to deliver LBW babies was found 2.97, 2.13 times respectively than the control women.

Our findings clarified that infants of mothers with DM in general and with GDM in specific are at higher risk of exposure to repeated abortion, stillbirth and to deliver low birth weight or macrocosmic babies. It is believed that most of the latter actually had undiagnosed diabetes-antedating pregnancy, thought obviously this cannot be proven in retrospect. Different standard and recommendation as tools of early detection of DM will address this with pregnancy (ADA, 1997 and ADA, 2000). Interestingly enough, when GDM subgroup were tested out from the group with diabetes, the undesired outcome did not change and still showed statistical significant. The findings of this study regarding diabetic women compared to the control group were as follows: there were macrosomia 54.8% vs. 29.0%, repeated abortions 45.2% vs. 45.2%, LBW 23.8% vs. 9.5% and stillbirths 29.8% vs. 13.6%. These findings are in sharp contrast with that of El-Roaf, (1997), who reported abortion of 11.2% and stillbirth of 5.9% among diabetic group. Stillbirth was 4.5% and low birth weight was 0.8% as reported by Al Dabbous et al in their study which performed in 1997 and macrosomia was 57.9% which is nearly similar to the figure of this study.

5.5 Adverse Outcome of Last Pregnancy Among Study Population

We considered pregnancy induced hypertension and preeclampsia, bleeding whether antipartum or postpartum, IUFD and difficult labour are common pregnancy complications and more likely related to DM with pregnancy. Our findings showed statistical significant relationship between reported complications and women groups. The above maternal complications were found more common among diabetic pregnant women, Odds ratio was 4.18. This means women with complications were exposed to DM 4.18 times than women without DM, this is in favour with Haire-Joshu, 1992 and ADA, 2000.

The findings of this study revealed that women with DM are more likely to be exposed to preeclampsia or hypertension during pregnancy than other pregnant women, Odds ratio = 4.08 and this relation is highly significant among pre gestational than women with GDM. In this study 50% of women registered as pre gestational DM had hypertension and 36.7% of women with GDM had hypertension. A higher frequency of complications was found more prevalent and cumulatively increased among diabetic group and more prevalent among women with GDM specifically. This means that more attention and close follow up are essential to avoid maternal complications and undesired outcome of pregnancy. This goes with similar studies conducted by different researchers, Bartha et al 2000, reported that women with early-onset gestational diabetes mellitus (n = 65), hypertensive (18.46% vs. 5.88%; P- value = 0.006) and had higher glycemic values. Sibia et al 1999 reported that among 462 subjects, 92 cases (20%) had preeclampsia, which rose significantly with increasing severity

of diabetes. El Raoof, 1997 indicated that 185 (20.3%) cases were PIH. Other studies showed relevant data; In France, Vambergue et al, 2000 who reported MGH was associated with adverse maternal and fetal outcome (P- value < 0.01), the rate of pregnancy-induced hypertension and caesarian section were not different between the MGH and control group (P- value = 0.08, 0.10 respectively).

The pregnancy loss (fetal) of last pregnancy was considered as a sum of "abortion, stillbirth, congenital malformation (CMF)", as an adverse effect of DM with pregnancy (Herman and Perry, 1997). This finding showed fetal loss is highly associated with DM and GDM in specific. The fetal loss among women with DM has been 5 times that of the control while in GDM women it is 3 times than the control in the last pregnancy. The risks to the fetus are clearly not equal; the former carries a particular high risk. The over all fetal loss of last pregnancy was 17.9%, 11.7% in diabetic group and GDM subgroup respectively which is in sharp contrast to that of the control group 3.6%. The high frequency of pregnancy loss rate found and noted in this study, which may be attributed to one or more of the following causes:

I) Possibilities of undetected and hence untreated DM with pregnancy in general and GDM specifically.

II) Delayed detection and management of GDM because screening for GDM was not routinely undertaken until 24 – 28 weeks of gestation.

III) Inadequate continuous close diabetes monitoring , evaluation and control.

IV) Poor patient compliance.

V) Absence of standardized treatment ,protocols of health care of diabetic women and

Lack of implementation of guidelines (Schaefer-Grafet et al, 2000).

These findings are in accordance with the findings of Northern diabetic survey where the fetal loss was 12.8%, they concluded that the diabetic pregnancy remains high risk and the delivery of more effective preconception care is needed (Hawthorne et al 1996). The findings are contradict to study conducted at Karachi where the fetal loss was 2.08% (Jawad and Irshaduddin, 1996). The researcher extended and focused on congenital anomaly (CA) as an important cause of fetal loss. It varied across this study population, where it was 6 times greater in diabetics than that in non-diabetics and constituted 20% of total loss in diabetic women. Our findings of CA outcome of last pregnancy is in accordance with some recently reported studies and in sharp contrast to others El Raoof, 1997 was 7.9%, Huddle, 1993 was 1.7% and Cundy et al, 2000 was 3.6%. The history of lost pregnancy, cumulative neonatal death and lost children were statistically significant and highly associated with diabetes mellitus in general and GDM specifically.

Plan for intervention to control and prevent loss of pregnancy should be a comprehensive plan dealing with women's health preconception, antenataly and postnataly. The plan components should include family planing, nutritional counseling, psychosocial support and other relevant issues. Close observation and monitoring of at risk group should be performed by clinicians, technical and laboratory staff.

5.6 Pregnancy Care

As regards the first antenatal visit registration mothers to be came late for booking. Our study findings showed that 51.2% of the total study population were registered for the first antenatal visit in a period ranges from 21 - 30 weeks gestation out of them 21.4% were diabetic women. This indicates late registration especially among diabetic pregnants, although the policy of early registration is recommended as a rule in the local community. This may be due to deficient knowledge and practice of women on risk factors and diabetes complications associated pregnancy. Weak health education on the benefit of early registration and lack of social support of pregnant women should be considered as a reason for late registration. This is in favour with Nahas, 1987 and Hollingsworth, 1994.

At present study it was found that 9.5% of the women registered with DM never checked up their blood glucose according to their maternity health records. 14.3% of diabetic group compared to 69.6% of control group checked up only once on blood glucose. The recommended policy of the antenatal services at the local community includes the regulation of early registration of pregnant women, as are certain of their pregnancy. Our findings showed 23 women (27.4%) reported FBG testing at gestational age of 13-20 weeks which is beyond the period of embryogensis, while 21.4% at gestational age 21-23 weeks and 8.3% reported first blood glucose testing at the gestational age ≥ 31. Undetected and untreated hyperglycemia could lead to fetal complications. The need for early booking is great because checking initial fasting serum glucose level provides important information for counseling of women if DM is diagnosed

and treated properly. This is in favour with Schaefer-Graf et al, 2000. The following are common reasons for delayed blood glucose testing are:

i) Lack of awareness of women and their physicians of the importance of pre-conceptual and early pregnancy diabetes care "early booking" (Huddel, 1999; Cundy et al. 2000).

ii) Women with no past experience will not recognize the symptoms of first trimester hypoglycemia or other symptoms related to diabetes.

iii) Poor antenatal facilities.

iv) Lack of community health education, facilities and the absence of relevant health intervention policies for safe motherhood.

This requires that media and health facilities should introduce health education regarding antenatal care in general and for diabetic care in pregnancy specifically. Explaining and stressing the importance of pre-conceptual and early antenatal diabetic care and control. The researcher believes that community health education is very important to improve the knowledge of women. In conclusion early registration and blood glucose measurement are extremely important in the early life of pregnancy below 20 weeks of gestation, for any women with one or more associated risk factor with pregnancy for early detection and early management. All pregnant women should be subjected to blood glucose testing according to health status at first antenatal visit.

5.7 Place of Delivery

One hundred sixty eight pregnant women (66.7%) of the study population reported hospital delivery for the last pregnancy, 82.1% of them were diabetics. Five (6.0%) women registered with GDM delivered at UNRWA maternity wards,

although the implemented early booking for hospital delivery system for all at high-risk pregnancy. Nine (10.7%) of the women registered DM with pregnancy delivered at private sector, although the private sector known by their lack of emergency equipment. One woman delivered at home, as she normally delivered at home. These results are not satisfactory if we know that the MoH supports the implementation of free-early booking and recommendation for hospital delivery for all risky pregnancies including diabetes mellitus.

Pregnant women with DM were liable to have delivery complications for example 26.2% of the diabetic group delivered by CS compared to 9.5% of the control group. This indicates that pregnant women with DM are more likely to be exposed to CS by 2.8 times more than the pregnant women without diabetes (odds ratio = 2.8, P-value = 0.000).

When compared to other similar studies, these findings go with Hollinsgrowth, 1994 who reported from California Survey from 1986-1988, on 1817 deliveries in diabetic women, CS rate varied from 38-56 %. Haire-Joshu, 1992 found the CS rate at 40 - 60% in women with pregestational diabetes as compared with a normal of 20%. The incidence of CS were found about 44.17% (El Raoof, 1997). In Dublin, Griffien et al, 1999 estimated the rate of CS among diabetic group at 18.5% and 5.4% in control group (Odds ratio = 4, P- value = 0.014). In this study the above reported high rates of CS between diabetic pregnant women indicates unsatisfactory antenatal care and unsuccessful diabetes management before reaching the 38 weeks of gestation and some studies showed that low rates of CS when satisfactory glycaemic control during pregnancy. Accordingly diabetes with pregnancy is not considered a direct

cause of CS delivery. This is in favour with report from American Diabetes Association in 2000 when reported GDM is not an indication for cesarean delivery or for delivery before 38 weeks completed gestation. The researcher confirmed by her findings the importance of early booking of diabetic women for high-risk pregnancy care where institutional delivery is a must to avoid any maternal or neonatal emergency situation.

5.8 Baby Birth Weight

It was observed that there was a significant difference between the two groups of the study population concerning delivered LBW or macrocosmic babies. DM with pregnancy is a strong attributable risk factor to exposed women to deliver LBW or macrosomia babies compared to women without DM (Odds ratio = 2.97, 3.32) respectively. LBW was 23.8% among diabetic group compared to 9.5% in non-diabetic group. In our study, this means that diabetics pregnant women were expose 2.97, 3.32 times to deliver LBW or macrosomia respectively compared to the controls. This agrees with York and Brown (1995). In present study macrosomia baby was 35.5% among diabetic group comparing to 13.7% in non-diabetic group. This high figure of macrosomia is highly associated with DM with pregnancy. This figure may be an indicator of undetected diabetes among control. This factor with poor patient compliance and inadequate monitoring and diabetic control is an indication of unsatisfactory glycemic control during pregnancy, whereas the LBW and macrosomia is directly affected by type of treatment. This agrees with Raychaudhuri et al, (2000). The current rate of macrosomia and LBW are higher than the range recently reported from other similar studies conducted in France, 1992, birth

weight ≥ 4000 gm was 16.0% in MGH group compared to 7.6% of control group (P-value = 0.05) (Vambergue et al, 1992). The prevalence rate of macrosomia was higher in the study of Aldabbous (57.9%). While Griffin et al 1999, reported 11.1% cases of previous macrosomia (> 4.5 kg, odds ratio 3.90). No macrosomia or LBW babies were reported by Jawad and Irshaduddin in their study performed in 1996, where the mean birth weight of the infants was 3.33 kg, 3.24 kg and 3.17 kg respectively in the three years study period. It is an indication of satisfactory glycemic control during pregnancy (Jawad and Irshaduddin, 1996).

In this study, significance was found between LBW or macrosomia babies and insulin treatment, P-value = 0.049, 0.015 respectively. An association between insulin intake as treatment of DM condition is more likely to protect women to have macrosomia babies and LBW babies 3, 0.32 times respectively. This explained that adjustment of hyperglycemia by insulin is important to reduce exposure (protection) the diabetic women to deliver macrosomia and LBW. Thirty-seven (44.0%) of diabetic pregnant women were reported to be on a diet therapy and 47 (56.0%) on insulin. Thirty one (51.7%) of women registered as GDM on diet treatment only (non-insulin). The researcher emphasizes the importance of the prophylactic effect of insulin. Other studies showed late treatment by insulin associated with increased rates of macrosomia and operative delivery and observed that those who take insulin were diagnosed early.

5.9 The Risk Assessment of Maternal Health Record

Pregnant women are classified into 3 groups according to risk assessment score low, medium and high in MoH and normal, alert, high risk in UNRWA. The reported risk factors at MHRs were investigated to evaluate the risk score of pregnancy according to WHO, 1994 and ADA, 2000. MHRs showed clear scoring. Accordingly in the present study the risk factors for assessment were bad obstetric history (habitual abortion, prenatal deaths, previous preeclampsia, bleeding related to pregnancy, previous cesarean section), hypertension with pregnancy, parity order ≥ 6, age ≥35 years and DM with pregnancy. These risk factors justify the need for special care, early antenatal and hospital booking. Our findings showed that the diabetics pregnant women reported bad obstetric history more than other pregnant women as judged by more cumulative bad obstetric history indicators. The presence of risk factors was associated significantly with poorer outcome. Parity order of ≥ 6 was the highest frequency reported in MHRs, followed by maternal age at ≥ 35 years old and DM with pregnancy which were 39.0%, 37.3% and 33.7% respectively. There is no difference between the reported risk assessment pattern at the MHRs in MoH and UNRWA (PHC) centers. In MoH the risk approach forms are present in every MHC to be used by medical and paramedical staff. This means that diabetic pregnant women need closer observation, more frequent evaluation and proper medical care to avoid the fetal and maternal complications and to decrease the high frequency of undesired outcome of pregnancy mentioned before. A clear, easily digested, accessible and formative risk score system should be unified and adapted by all health providers.

5.10 Knowledge of the Women

Our findings showed lack of knowledge and awareness of women on health events leading to risky pregnancy and on DM with pregnancy (symptoms and complications), which draw our attention to the need to increase the awareness. Whereas 64.9% of the interviewed women mentioned one to four of the mentioned health events considered as causes of risky pregnancy. While 52.5% of the interviewed women mentioned economic situation, malnutrition, poverty, social problems, massive increase body weight in pregnancy, short birth intervals as contributing events leading to high risk pregnancy. The researcher considered their opinions very close to the reality, as the mentioned risk factors, stress and diet habits are all known to contribute to DM. Our findings reflect the poor level of health education programs. This requires that media, health facilities and school health programs should introduce health education with regards to risk factors associated pregnancy, this is in consistent with El-Ebweini, in 1995.

Approximately 83.3% of the total sample were aware and mention that diabetes complicated pregnancy. The majority mentioned that fatigue and drowsiness are the most common symptoms, while 7.4% of women registered with DM did not mention any of the well known fetal complications liable to occur among pregnancies with DM, compared to 24.4% of the control group. It was found 37.4% of interviewed women mentioned other maternal complications like persistent of DM after delivery, recurrent infections, (myocotic infection, urinary tract infections), out of them 10.0% of the interviewed women mentioned DM with pregnancy more costly due to more investigations, more antenatal visits,

the need of frequent hospitalization. Some mentioned negative social impact and secondary infertility.

The researcher believes that the knowledge of women in general needs improvement. More efforts through comprehensive health education and counseling are needed. Appropriate antenatal health services and community health education programs are essential to improve the knowledge and practice of women towards their health events leading to risky pregnancy especially the symptoms and complications of DM. Training of nurses and midwives in form of workshops and seminars in this matter are recommended.

5.11 Degree of Satisfaction

Eighty percent of interviewed women were satisfied and comfortable in regards to the existing antenatal and postnatal services. This reflects the major effort paid by the MoH and UNRWA primary health care units towards maternal and child health care improvement, especially if compared to satisfaction rate before the Palestinian National Authority assumed responsibility. In this part it is difficult to explain these findings, especially because these are opinions and it is difficult to measure them. However, it is still an indicator for the evaluation of the general condition. In this study 98.4% of interviewed women mentioned the antenatal care are important, different justification for that: 96.0% mentioned that early detection of health problems, 94.0% for provision of good medical services and 93.7% for investigation including investigations of risky pregnancy and the benefit of health education services. In spite of this 20% of the interviewed women reported problems related to existing antenatal services.

Out of which, 38.0% showed problems in waiting time, 17.3% defects in appointment system. While 10.6% showed defects in laboratory services and delayed of results for some days, 59.9% reported defects in diagnostic equipment (ultrasound services), 39.1% mentioned problems in shortage of qualified health professionals to give comprehensive services and to deal with high-risk pregnancy at PHC level. Some reported that the gender is very important and requested availability of female health professionals; doctors and laboratory technicians, which goes with the religion, cultural and social values. Majority of interviewed women asked for standardization of maternal services as well as to facilitate referral services between the two health providers (MoH & UNRWA).

These findings are very similar to the local study conducted by El-Ebweini, in 1995 on determinants of antenatal care utilization in two Palestinian communities in Gaza Province on 200 mother's and focus group discussion of 6 health professionals. The result showed 71% of the total population were happy of antenatal care services, 54.5% under utilization, 99.5% reported the importance of antenatal, among them 78.5% for medical reasons, 61.5% reported waiting time between 30 minutes and 2 hours. Lack of knowledge and a negative attitude towards antenatal care were reported. Women used antenatal care services mainly as curative rather preventive and recommended further comparative studies on the quality of antenatal care delivery and providing laboratories and ultrasound facilities and appointment by booking system.

Chapter 6
Conclusion

Chapter 6

Conclusion

The results of this study are unique in providing detailed documented information on the status of diabetes mellitus with pregnancy and risk factors that may be associated with prediction of diabetes complicated pregnancy in the Southern area of Gaza Province. The aim of the study was to identify diabetes mellitus status among registered pregnant women in primary health care centers in MoH and UNRWA in Khan Younis and Rafah governerates at the Southern of Gaza Province. The role of health professionals was studied through a questionnaire that examined knowledge and practices regarding definition, early detection, screening, complications, management and guidelines regarding diabetes mellitus with pregnancy (Appendix XIII). To our knowledge this is the first local study on DM with pregnancy and such information are urgently needed because the cumulative risk factors associated are high. From the results of this study the following conclusions are based on identified diabetes mellitus with pregnancy expresed in terms of associated risk factors, and indicators, adverse reaction in terms of maternal and fetal complications, managment , knowledge of women and their satisfaction :

- The results showed low detection rates of diabetes with pregnancy and below the expectation: the estimated reported prevalence of diabetes mellitus in this study through 1999 was 0.49%, and first half of 2000 was 0.41% which gives collective prevalence equal to 0.46 %. The estimated reported

prevalence of GDM in 1999, and at first half of 2000 was found 0 .36 %, 0.29% respectively. This may be attributed to the following :

1) Late screening of pregnant women at 24 - 28 weeks of gestation gives late detection and under-diagnosis of diabetes mellitus with pregnancy and GDM specifically.
2) Although using risk factors-based screening tools, even when applied properly, will only identify approximately 50% of pregnant women complicated with diabetes.
3) Under reporting, the lack of awarness, knowledge of health professionals and poorly implemented standard guidelines towards early detection and early management may exaggerate the problem.
4) Poor patient compliance regarding antenatal services
5) Lack of community health education, unavailability of small booklets in arabic and limited public educational lectures.

- UNRWA, PHC centers reported higher prevalence of diabetes with pregnancy and GDM specifically compared to MoH PHC. This may be attributed to variation in diagnostic procedures.

- Accumulation of risk factors strongly associated and enhancing occurrence of DM with pregnancy in this study, clarified the etiologic relationship and its predictive ability for subsequent of maternally DM and the possibility of undetected cases. The most significant findings was the association of the chance of women to have DM with pregnancy is increase steadily with increased prevalence of risk factors and this increase becomes more liable to

occur when there are more cumulative risk factors. Primary prevention by early detection and identification will reduce the future need for intervention. To achieve this primary prevention is always more cost-effective than secondary or tertiary i.e. than increase resources and future implementation in sophisticated. Accordingly risk assessment for GDM should be undertaken at the first prenatal visit.

- Strong family history of diabetes mellitus was the highest addressed risk factors and accumulates in Palestinian families at study area, as prediction of GDM confirms that genetics has a significant role to play in the etiology of diabetes.

- Maternal age and conception was strongly associated with diabetes, whereas 56.7% women of the total study population fell in the age group of ≥ 31 years old, approximately half of them were diabetic which equal to 85.7% of diabetic group as a whole. Any pregnant woman with age at ≥ 31 years old is predicted to have DM, GDM complicating their pregnancy 8.2, 12.3 times respectively than pregnant women at age ≤ 30 years old. These results indicate the lack of awareness between women of the danger to get pregnant at these ages.

- High prevalence rates of obesity were found 61.9 % of the total sample, 80.9% among diabetic group and 85.0% among GDM population. Frequent association with obesity suggests obesity as a public health problem in majority of pregnant women and at risk of diabetes. Encouraged physical activity, post

partum weight reduction will decrease the possibility of developing diabetes later in life.

- High Parity order of ≥ 6 was strongly associated with diabetes, this indicate the use of antenatal care more curative than preventive. The role of family planning is basic and important to reduce the high parity, improve women's health status in the context of welfare concerns and economic benefits.

- In conclusion, the accumulation of these risk factors may be attributed to inadequate knowledge of pregnant women regarding the risk factors associated with pregnancy. Dietary habits and the lifestyle in Gaza can affect the physical activity carried out daily. Weak health education programs and nutritional counseling at the community level through antenatal services, lack of health professionals knowledge on diabetes mellitus with pregnancy adds to the impact of risk factors.

- Our population with a high prevalence of risk factors as obesity, maternal age at conception, family history of DM, high parity and previous history of GDM are strong reasons to implement early screening of pregnant women.

- The infants of mothers with diabetes in general and GDM in specific are at higher risk of an undesired outcome "repeated abortion, stillbirth and low birth weight or macrosomia babies". Those clarify that any women with one or more of past history of this undesired outcome should be investigated early as she has a chance to develop diabetes with pregnancy.

- The prevalence of reported maternal complications among pregnant women in the local community are high. The prevalence of maternal complications is still higher and cumulatively increased among diabetic group in general and GDM specifically, which means that more attention, close follow up and proper medical care are essential to avoid maternal complications and undesired outcome of pregnancy.

- There was strong association between pregnant diabetics and the likely exposure to preeclampsia and/or hypertension during pregnancy more than pregnant women without diabetes. This is more significant among pregestational than women with GDM. This highlights the poor control of high glycemia.

- Women with DM in pregnancy or GDM have an increased risk for pregnancy loss (abortion, stillbirth, congenital anomaly), perinatal mortality, neonatal mortality, infant mortality, child mortality and morbidity (adverse maternal and fetal outcome) and are at increased risk for development of diabetes.

- The presence of a large percentage of maternal and fetal complications among the pregnant diabetics can be attributed to several factors: late booking, patient's ignorance or negligence in receiving their treatment, poor compliance, and presence of some defects in the health services provided. The degree of the disturbance of carbohydrate metabolism that can cause reproductive damage needs to be evaluated and researched. Risk factors other than

glycemic control such maternal obesity, family history of DM, maternal age and high parity which contributing for fetal loss should be considered.

- The prevalence of complications among pregnant women in the local community was high and statistically significant. Although the increased prevalence rates of different risk factors associated DM (as mentioned above) among the study population, the detected numbers of diabetes with pregnancy and GDM specifically in this study are less than the expectation.

- Reported statistically significant relationship of the late registration at first antenatal visit among diabetic women group. Whereas, 57.1% of diabetics pregnant women reported their first antenatal visit after 12 weeks while 8.3% of them after 31 weeks. This indicates poor patient compliance. This may be due to the following: lack of knowledge and awareness of diabetic women on the benefit of early booking as early prevention and management, undetected cases where the GDM appear mostly at second trimester (mid-pregnancy), inadequate role of community health program and preconception counseling through health education, suggesting the importance of early diabetic care.

- MoH presented 71.4% of diabetic women were tested for blood glucose and 25% for control group according to their maternity health records. This suggests that the benefit of teamwork approach is in needed. The availability of diabetologist especially at risk clinics is asked for the direct follow up, teamwork (Obstetrician, midwife, laboratory worker, dibetiologist and pediatrician), psychotherapy, preconception counseling and monitoring services are also recommended.

- In UNRWA blood glucose was tested for 94.3% of diabetic group and 88.9% for control group, UNRWA implements a screening system to all pregnant women with gestational age 24 - 28 weeks; any pregnant woman with FBG ≥105 mg/dl is subjected to do oral glucose tolerance test (OGTT) as a diagnostic tool. In spite of that, the prevalence rate of DM with pregnancy was still below the expectation.

- The late booking for fasting blood glucose testing is attributed to: may be due to lack of awareness of the importance of early booking and importance of diabetes with pregnancy among patients and their physician. Or may be due to poor antenatal facilities, the lack of community health education facilities and the absence of relevant health intervention policies in safe motherhood. The need for early booking is great because checking initial fasting serum glucose level provides important information for counseling of women if DM is diagnosed and treated properly. All this suggests the importance of pre-conceptual and early pregnant diabetic care.

- The hospital delivery was 66.7% among the study population. Whereas 82.1% were in diabetic group. While 10.7% of diabetic pregnant women delivered at private sector and 8.3% of GDM delivered at UNRWA maternity, in spite of the MoH supports the implementation of free-early booking and recommendation for hospital delivery for all risky pregnancies including diabetes mellitus. The findings ensured and confirmed that women with DM should be booked for high-risk pregnancy clinic where institutional delivery is a

must to avoid any maternal or neonatal emergency situation and more for diabetics mother's babies care.

- An association had been shown between diabetics' pregnant women and non-diabetics in exposure to CS (26.2% vs. 9.5%). This indicates that pregnant women with DM are likely to be exposed to CS 2.8 times than non-diabetics' pregnant women. The reported high rate of CS between diabetics' pregnant women indicates unsatisfactory antenatal care and unsuccessful diabetes management before reaching the 38 weeks of gestation.

- An association had been shown between last baby birth weight among women with DM and control group. The result showed tendency of diabetic mothers to deliver LBW 24% vs. 10% and macrosomic babies 35% vs. 14% than mothers without DM. The findings may be ascribed to lack of health education; poor follow up, inadequate compliance, poor monitoring and late detection.

- An association had been shown between birth baby weight and treatment by insulin, this clarifies that insulin could be prophylactic and important to reduce exposure of the diabetic women to deliver LBW and macrocosmic babies by 3, 0.32 times respectively.

- Our study findings assumed that diagnosis of GDM therefor is important since identifying patients earlier will prevent the adverse outcome mentioned before, suggestion for continuing need for comprehensive program of care.

- There is no difference between the reported risk assessment pattern at the MHRs in MoH and UNRWA (PHC) centers. Women with DM during pregnancy reported bad obstetric history more than other pregnant women, due to cumulative of risk factors. This highlights that pregnant women with DM need more close observation, frequent evaluation and proper medical care to avoid the fetal and maternal complications. Clear, easily digested, accessible and formative risk score system should be unified and adapted by all health providers.

- There was lack of knowledge among women, firstly on health events that lead to an at risk pregnancy and secondly on the symptoms and complications of DM. This is in general indicates the low quality of the health education provided to pregnant women and the lack of a community health program.

- Eighty percent of interviewed women were satisfied and comfortable in regards to the existing antenatal and postnatal services. This reflects the major effort paid by the MoH and UNRWA primary health care units towards maternal and child health care in the presence of Palestinian National Authority. Approximately 98.4% of women mentioned that antenatal care is important for the benefit of antenatal care for early detection, provision of good medical services, investigation and health education. Minority of women showed problems in waiting time, defect in appointment system, defect in ultrasound services, shortage of qualified health professionals especially female health professionals. Majority of women asked for standardization of maternal health

services as well as to facilitate referral services between the both health providers (MoH & UNRWA).

- There were a significant differences between medical and paramedical health professionals participants in majority of answers to the questions regarding DM with pregnancy associated DM, while the years of experience was not significant. Availability of written guidelines and previous training related to DM with pregnancy by participants were inadequate and different between UNRWA & MoH which lead to lack of harmonization of service between the different health providers. The knowledge and practice of the health professionals working in PHC centers and secondary health care centers (hospitals) were found to influence the requested level of management. In general, the monitoring and evaluation of health professionals practice is essential for improvement.

- The primary goal in the management of diabetic pregnancies is a good outcome with minimal morbidity and no mortality for mother, fetus and newborn. To achieve this goal, the patient should have good antenatal care at frequent intervals with early detection and treatment of minor and major complications.

Chapter 7
Recommendation

Chapter 7

Recommendation

1) Recommended screening tools to detect diabetes mellitus in pregnancy is a must, to be requested in the first natal visit. Those tools should be, achievable, highly specific and sensitive and available at PHC level in MoH and other health providers.

2) Standardization of diagnostic criteria for diabetes mellitus with pregnancy at national level.

3) Directing efforts towards developing a community based Health program in diabetes mellitus with pregnancy in general and GDM in specific. The program should address the needs of the local community and to be an integral part of the activity of all health providers.

4) A comprehensive investigation for all pregnant women with one or more common risk factors associated with diabetes mellitus in pregnancy should be investigated to exclude glucose intolerance.

5) All women in whom gestational diabetes mellitus is diagnosed should be followed up during postpartum period and later at regular intervals in order to detect diabetes mellitus early in its course and follow up at regular intervals should be continued.

6) To minimize pregnancy and delivery-related complications, pregnant women should be advised about the importance of preconception counseling. It is recommended to decrease the risk factors and rate of complication among the pregnant women.

7) Preparing a comprehensive package of women's care health services at PHC level is essential. Including family planning, diet counseling and social counseling especially for women with one or more risk factor (Obesity, high parity, pregnant at age 30 year or more, strong family history of diabetes, past history of GDM and consanguineous marriage).

8) Strengthening the role of primary health care in the prevention and management of diabetes mellitus in general and in specific with pregnancy.

9) Comprehensive antenatal services are recommended including:

a. The central role of counseling skills in the delivery of effective antenatal care.

b. Early booking (registration), proper screening, recommended antenatal visit every two weeks and when necessary, team work approach, proper monitoring, blood glucose control, individual standard treatment is recommended as the backbone for effective plan for reduction of maternal and fetal complications.

c. Appointments by booking system should be used to reduce the waiting time as one of the means to improve the quality of care given for each pregnant woman.

d. Antenatal fetal monitoring and Doppler ultrasonography is recommended for follow up since it serves as an earlier predictor of fetal complications, even if all other fetal health assessment were of normal values.

10) Constructions of clear simple technical guidelines and protocols dealing with DM in pregnancy and raise the quality of health care for health professional by:

a- Improving health professional performance.

b- In service training of the health staff as ongoing activities by all health care providers especially in MCH clinics and continuous education as a core stone for improvement of performance.

c- Monitoring and evaluation of health professional practice is essential for correction.

11) Developing a diabetic clinic in PHC-MoH centers at the Southern area for dealing with diabetics pregnant women through one or two days in the week.

12) Establishment of a computerized registry program for diabetic pregnant women.

13) Enhancement of management information system across the MCH at PHC sectors of reporting is recommended.

14) Development of action-oriented home-based maternal records at PHC in MoH. Those records will help prevention, and/or early detection of complications leading to safe motherhood.

15) Improved referral services between UNRWA and MoH for risky group and encourage institutional delivery and hospital delivery for specific group (risk group).

16) Harmonization of services between MoH & UNRWA PHC centers on standardization of maternal services and to facilitate institutional delivery under qualified health staff and to be free of charge for all deliveries and not limited to high risk pregnant and a periodic health assessment.

Areas for future research:

1- A national community based survey among pregnant women to identify the real prevalence of diabetes mellitus with pregnancy and the reasons behind this decrease in detection rates in current study.

2- Further analysis to detect confounder and interaction between risk factors.

3- More research into epidemiology and prevention of diabetes with pregnancy is needed.

References

References

Abdella, N.A. et al, (1997). Pattern of non-insulin dependent diabetes mellitus in Kuwait. Diabetes research clinical practices. Eastern Mediterranean Health Journal, Bibliography abstract of recent literature on noncommercial disease, Vol. 3, No. 3, pp. 597-8.

Abu Mousa, H. (1987). Anemia of pregnancy among refugee women in Gaza Strip. A thesis of Master of Science in mother and child health, Institute of child health University of London, U.K.

Abu Mousa, H. (1994). Family planning knowledge, attitude and practice (KAP) and focus group survey of Palestinian refugee community. Maternal health project. F.P.M.O./UNRWA - Gaza.

Abu Mousa, HS. (1999). Magnitude of diabetes mellitus in Gaza Strip. Health Program UNRWA-Gaza, pp. 4 -33.

Abu Sha'aban, D. (1991). Anemia of pregnancy in Gaza. A research was conducted for evaluation of public health service and intervention purposes. Gaza Health services Research Center (GHSRC). Unpublished.

Al Dabbous, I.A. et al (1997) . Perinatal morbidity and mortality in offspring of diabetic mothers in Qatif, Saudi Arabia. Eastern Mediterranean Health Journal, Bibliography abstract of recent literature on noncommercial disease, Vol. 3 , No. 3, pp. 597- 98.

Alwan, A.A.S. (1994). Management of diabetes mellitus: Standard of care and clinical practice guidelines. World Health Organization (WHO), Regional Office for the Eastern Mediterranean, Alexandria, Egypt, pp. 3 - 32.

Alwan, A. (1997). Noncommunicable disease: a major challenge to public health in the region. Eastern Mediterranean health Journal, Vol. 3, No. 1, pp. 6 – 14.

American Diabetes Association (ADA). (1997). Diabetes care Alexandria, Virginia, pp. 1-22. http://www.diabetes.org/DiabetesCare/197-07/pg1183.htm.

American diabetes association. (1997). The Expert Committee on the diagnosis and classification of diabetes mellitus. Diabetic care. Alexandria Virginia, Vol. 20, No. 7, pp.1-12.

American Diabetes Association. (1999). Diabetes and Pregnancy, pp.1-5. file://A:\Diabetes And Pregnancy.htm.

American Diabetes Association. (1999). Gestational diabetes. Treatment, pp. 1 - 4 . http://www.diabetes.org/ada/c50d.asp.

American Diabetes Association. (2000). Clinical practice recommendations. Gestational diabetes mellitus, definition, detection and diagnosis. Diabetic care, Vol. 23, Supplement 1.

American Diabetes Association and WHO. (1997). Announce new classification and diagnostic criteria for diabetes. Diabetic Monitor: New classification for diabetes, pp.1-10. http://diabetesmonitor.com/dx-class.htm.

Anastasiou, E., Alevizaki, M., Grigorakis, S. J., Philippou, G., Kyprianou, M. and Souvatzoglou, A. (1998). Decreased stature in gestational diabetes mellitus. Diabetologia , Vol.41, pp. 997-1001.

Atilano, L.C., Lee-Parritz,A., Lieberman, E., Cohen, A.P. and Barbieri, R.L. (1999). Alternative methods of diagnosing gestational diabetes mellitus. Obstetric and Gynecology American Journal, Vol.181, No. 5, pp. 1158 - 61.

Bartha, J. L., Del-Fresno, P. M. and Comino-Delgado, R. (2000). Gestational diabetes mellitus diagnosed during early pregnancy. Obstetric and Gynecology American Journal, Vol. 182, No. 2 , pp. 346 –50.

Basal, N. (1999). Assessment of High-Risk Pregnancy Services at Primary health Care Level in Gaza Strip MoH, p. 50. Project of Master of public Health, Public Health School, Al-Quds University, Palestine.

Beischer, N.A., Wein, P., Sheedy, M.T. and Richard, M.D. (1996). Effect of follow up of women with GDM on ratio of IDDM to NIDDM in pregnancy. Diabetic care, Vol. 19,No. 6, p 653.

Berkow, R. and Fletcher, A.J. (1992) .The Merck manual of diagnosis and therapy. Pregnancy complicated by disease, pp 1870-1894.

Brydon, P., Nicholson, H. O. and Dunne, F. (1998). Congenital malformation in offspring of mothers whose pregnancy is complicated by diabetes mellitus. Diabetic Medicine. Journal of the British Diabetic Association, Supplement 2, Vol. 15, p S 47.

Brydon, P., Smith, T., Nicholson, H.O. and Dunne, F. (1998). Fetal loss in pregnancies complicated by diabetes mellitus. Diabetic Medicine, Journal of the British Diabetic Association, Vol. 15, supplement 2, p S 42.

Catalano, PM., Huston, L., Amini, SB. and Kalhan, SC. (1999). Longitudinal changes in glucose metabolism during pregnancy in obese women with normal glucose tolerance and gestational diabetes mellitus. Obstetric and Gynecology American Journal, Vol. 180, No .4, pp. 859 - 65.

Coustan, D.R. (1995). Gestational Diabetes. Diabetes in America. National Diabetes Information Clearinghouse (NDIC). E-mail: ndic@info.niddk.nih.gov.

Crombleholme, W. R. (1999). Obstetrics. Diabetes mellitus. Medical diagnosis and treatment, Current, a Lange medical book 38 th edition, chapter 18, pp. 750 - 751.

Cundy, T. Gamble, G. Townendt, K., Henley, P.G., MacPhersont, P. and Robertst, A.B. (2000). Perinatal mortality in Type2 diabetes mellitus. Diabetic Medicine, Journal of the British Diabetic Association, vol. 17, No.1, pp. 33-39.

Edda'ma, M. R. (1995). Risk factors associated with anemia among pregnant women in two Palestinian communities in Gaza Strip. A thesis of Master of Science in maternal and child health, University of London, U.K.

El-Ebweini, S. M. (1995). Determinants of antenatal care utilization in two Palestinian communities in the Gaza Strip. A thesis of Master of Science in maternal and child health, University of London, U.K.

El-Hammami, F. (1999). Assessment of family planning service at the primary health care centers in the ministry of health Gaza Strip, Palestine. Project of Master of public health, Public Health School, Al-Quds University, Palestine.

El-Hazmi, MAF. , Warsy, AS., Al-Swailem, AR., Al-Swailem, AM. and Sulaimani, R. (1998). Diabetes Mellitus as a Health problem in Saudi Arabia. Eastern Mediterranean Health Journal. WHO, Vol. 4, No. 1, pp. 58-66.

El-Nady, O. (1998). Biophysical scoring, Doppler study and maternal serum fructosamine in diabetic pregnancy. A thesis of Master in Obstetric and Gynaecology, Faculty of Medicine Ain Shams university, Cairo.

El Raoof, M. A. (1997). Perinatal outcome of diabetic pregnancies in the past 7 years in Ain Shams university hospitals. A thesis of Master in Obstetric and Gynaecology, Faculty of Medicine Ain Shams university, Cairo.

Everet, W. D. (1989). Screening for gestational diabetes: an analysis of health benefits and costs. Diabetes in pregnancy, American journal of preventive medicine. Vol. 5, No. 1, pp. 38 - 43.

Griffin, M.E.,Coffetyt, M., Johnsont, H., Scanlon, P., Foleyt, M., Stronget, J., O'Meara, N.M. and Firth, R.G. (2000). Universal vs. risk factor-based screening for gestational diabetes mellitus: detection rates, gestation at diagnosis and outcome. Diabetic Medicine, Journal of the British Diabetic Association, vol. 17, No.1, pp. 26 - 31.

Hafez, G. (1998). Maternal mortality: a neglected and socially unjustifiable tragedy. Eastern Mediterranean health Journal, WHO Regional office for the eastern Mediterranean, Alexandria, Egypt. Vol. 4, No. 1, pp.7 - 10.

Haire-Joshu, D. (1992). Management of diabetes mellitus. Perspectives of care across the life span (Mosby yearbook). Diabetes and pregnancy, chapter 9, Pricilla Hollander, pp. 330 - 332.

Hawthorne,G. ,Roberts, S.H., Robson, S. ,and Ryall, F.A. (1998). Pregnancy outcome in established diabetes in the northern region. Northern diabetic pregnancy Survey based at North Shields, Tyne and Wear. Diabetic Medicine, Journal of the British Diabetic Association, Supplement 2, Vol. 15, p S 43.

Herman, W.H. (1991). Adverse outcomes of pregnancy. The prevention and treatment of complications of diabetes mellitus: a guide for primary care practitioners. http://www.cdc.gov/diabetes/pubs/brn_tx2.h .

Herman, B. and Perry, S. (1997). Diabetes and Pregnancy. Lycos Health Network http://webmd.lycos.com/content/dmk/dmk_article_3961115.

Herman, WH. Aurbert, RE. Ali, MA. Sous, ES. and Badran, A. (1997). Diabetes mellitus in Egypt: risk factors, prevalence and future burden. Eastern Mediterranean Health Journal, Vol. 3, No. 1, pp. 144 - 48.

Hod, M., Rabinerson, D. and Peled, Y. (1995). Gestational diabetes mellitus: Is it clinical entity?. Diabetes and pregnancy, diabetes reviews journal, Vol. 3, No. 4, pp. 602 - 613.

Hollinsgrowth, D. R. (1994). Pregnancy, diabetes and birth: A management guide, second edition. pp. 29 -158 .

Hong, P.L., Benjamin, F. and Deutsch, S. (1989). First prenatal visit glucose screening. Diabetes in pregnancy, *American Journal of Perinatology.* Vol. 6, No.4, pp. 433 - 436.

Huddle, KRL. (1999). Principle of management. Diabetes in pregnancy. Diabetes international review article Middle East / Africa edition. Vol. 9, No. 3, pp. 53 - 54.

Hundt, G., Abed, Y., El Alem, A. and Shawwa, R. (1997). Evaluation and improvement of maternal and child preventive health resources and services of Palestinians in Gaza Strip. Gaza Health Services Research center (GHSRC), pp. 4 -32.

Jang, H. C., Min, H. K., Lee, H. K., Cho, N. H. and Metzger, B. E. (1998). Short stature in Korean women: a contribution to be multifactorial predisposition to gestational diabetes mellitus. Diabetologi, Vol. 41, pp. 778 - 783.

Jawad, F. and Irshaduddin, PK. (1996). Prevalence of Gestational Diabetes and Pregnancy outcome in Pakistan. Eastern Mediterranean Health Journal WHO, Vol. 2, No. 2, pp 268 - 272.

Jovanovic-Peterson, L. (1994). Medical management of pregnancy complicated by diabetes. Prepregnancy counseling, monitoring and gestational diabetes. Clinical education series, pp. 3 - 87.

Karam, J. H. (1999). Diabetes mellitus and hypoglycemia. Medical diagnosis and treatment, Current, a Lange medical book 38 th edition, chapter 27, pp. 1147 - 1148.

Landon, MB. et al. (1990). Management of diabetes mellitus and pregnancy. A survey of obstetricians and maternal fetal specialist. Obstetric and Gynecology American Journal, Vol. 75, p 635.

Ma'had Abhath As-Syasat Al-Iqtisadiyeh Al-Fillistini (MAS). (1998). Social Monitor Jerusalem, pp 13 - 16.

Mohsen, S.M.S. (1993). Glycosylated haemoglobin and fructosamine as screening tests for gestational diabetes. A thesis of Master in Obstetric and Gynaecology, Faculty of Medicine Ain Shams university, Cairo.

Moore, T.R. (1994). Diabetes in pregnancy. Maternal fetal medicine, principle and practice, Creasy, RK. & Resnik, R. Third edition, Chapter 54, pp. 934 -71.

Nahas, H. (1987). Delivery and outcome of pregnancies who come to deliver at Ramallah Hospital without any previous booking at any antenatal care clinic. (Unpublished).

Centers for Disease Control and prevention (CDC). (1998). National Diabetes Fact Sheet. The portable document format. pp.1-9. Internet file: http://www.cdc.gov/diabetes/pubs/facts98.htm.

Orland, M.J. (1995). Diabetes mellitus in pregnancy. The Washington Manual, Manual of Medical Therapeutics, 28 Edition, chapter 20, pp. 456 - 57.

O'Sullivan, J.B. (1995). Diabetes Mellitus in Pregnancy. 2nd edition. New York, NY: Churchill Living stone, pp. 389 - 397.

Palestinian Ministry of Health (MoH). (1995). The Health Status of Population: Annual Report , 1990-1994. Gaza Health Services Research Center, p 19.

Palestinian Ministry of Health (MoH). (1997). The Status of Health in Palestine. Annual Report, PNA, Health Services Research Center, p 50.

Peiris, A.N. et al. (1988). Glucose metabolism in obesity: influence of body fat distribution. Journal of Clinical Endocrinology and Metabolism, Vol. 67, pp. 760 - 7 .

Pendergrass, M., Fazioni, E. and Defronzo, R.A. (1995). Non-insulin-dependent diabetes mellitus and gestational diabetes mellitus: same disease, another name?. Diabetes and pregnancy, Part I. Diabetes reviews journal, Vol. 3, No. 4, pp. 566 - 583.

Pillitteri, A. (1995). Maternal child health nursing, care of the child bearing and childbearing family high-risk pregnancy: the woman with a preexisting or newly acquired illness, the woman with diabetes mellitus, second edition, pp.328 -772.

Raychaudhuri, K. and Maresh, J.A. (2000). Glycemic control throughout pregnancy and fetal growth in insulin-dependant diabetes. Obstetrics & Gynecology American Journal, Vol. 95, No. 2, pp. 190 - 4.

Reece, E.A. and Homko, C.J. (1993). Diabetes-related complications of pregnancy. National Medical Association Journal, Vol. 85, No. 7, pp. 537 - 545.

Schaefer-Graf, M., Buchanan, T.A., Xiang, A., Songster, G., Montoro, M. and Kjos, S.L. (2000). Pattern of congenital and relationship to initial maternal fasting glucose levels in pregnancies complicated by Type 2 and gestational diabetes. Obstetric and Gynecology American Journal, Los Angeles, California. Vol. 182, No.2, pp. 313 -20.

Sibai, B. M. Caritis, S., Hauth, J., Lindheimer, M., VanDorsten, P., MacPherson, C., Klebanoff, M., London, M., Miodovnik, M., Paul, R., Meis, P., Dombrowski, M., Thurnau,G., Roberts, J. and McNellis, D. (2000). Risks of preeclampsia and adverse neonatal outcomes among women with pregestational diabetes mellitus. Obstetric and Gynecology American Journal, Vol. 182, No. 2, pp. 364 - 9.

Siccardi, D. C. (1997). Gestational diabetes – obstetrics and gynecology-Medstudents. Federal University of Rio de Janeiro-Brazil http://www.medstudents.com.br/ginob/ginob4.htm.

Türmen, T. (1998). Safe motherhood. Eastern Mediterranean Health Journal, WHO Regional office for the Eastern Mediterranean, Geneva, Switzerland, Vol. 4, No. 1, p 6.

UNRWA Technical instruction series. (1997). Prevention and control of non-communicable diseases, pp. 14 - 16. No: *HD/DC/ 01/97.*

United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA). (1999). Annual report of the department of health. Family health pp. 31 - 6.

UNRWA, Chief Director. (1999). Diabetes in pregnancy. H MG/ M / 159.

Vambergue, V., Nuttenst, M. C., Verier-Mine, O., Dognin, C., Cappoen, J. P. and Fontaine, P. (2000). Mild gestational hyperglycemic, maternal and neonatal complications. British Diabetic Association. Diabetic medicine. Vol. 17, pp. 203 -208, France.

Willhoite, M.B., et al. (1993). Impact of preconception counseling on pregnancy outcomes: the experience of the Maine diabetes in pregnancy program. American Diabetes Association. Diabetes Care abstract. Internet file. Website:www.diabetes.org. Vol. 16, No. 2, pp. 450 - 455.

World Bank. (1994). A new agenda for women's health and nutrition. A World Bank Publication, pp. 1 - 5.

World Health Organization "WHO". (1994). Care of mother and baby at the health center: a practical guide. Maternal and Newborn Health. Report of a Technical Working Group. Geneva, 31 October-4 November, WHO/ FRH /MSM/96.8. pp.1 - 27.

WHO. (1998). WHO press release WHO/63. Eastern Mediterranean Health Journal, Vol. 5, No. 1, p. 13.

York, R. and Brown, L.B. (1995). Women with diabetes during pregnancy: sociodemographics, outcomes and costs of care. Public health Nursing, Vol. 12 No. 5, pp. 290 - 293.

Zoller, D.P., Jurica, J.V., Gould, S.H. and Weinstein-Mayer, S. (1988). Screening for gestational diabetes. The journal of the American board of family practice, Vol. 1, No. 2, pp. 98 -100

Appendices

Appendix (I)

List of Technical Group of Professionals Working in MoH and UNRWA Fields: -

Dr. Yehia Abed, General Director in the MoH and Dean School of Public Health, Al Quds University.

Dr. Abd El-Jabbar El-Tibi, Director General of Primary Health Care MoH.

Dr. Ragdah Shawwa , External Director General of Child Health MoH.

Dr. Dina Abu Sha'ban, Director of Women Health MoH.

Dr. Ali Nouh Qa'oud, Director of Health Community Department MoH.

Dr. Sedki Sha'at, Director of Maternity Health Department MoH.

Dr. Mahmoud Saidam, Head of Medical Departments in Nasser Hospital.

Dr. Suhail El-Kishawi, Consultant of Endocrinology MoH and Head of Medical Department in Shifa Hospital.

Dr. Solaiman El-Astal, Internist and Endocrinologist in Nasser Hospital.

Dr. Ali Baker, Director General of Medical Research MoH, Gaza.

Dr. Ibrahim El-Habbash, Director of Maternity Hospital MoH, Gaza.

Dr. Abd El-Kareem El-Farra, Head of OBS/GYNE Departments of Nasser Hospital, Khan Younis.

Dr. Saie'd Ismail, Specialist of OBS/GYNE PHC - UNRWA.

Dr. Hussain Rabah, Specialist of OBS/GYNE PHC - UNRWA.

Dr. Bassam Koffa, Specialist of OBS/GYNE PHC – MoH.

Appendix (II)

Flow Chart of the Referral System for Pregnancy Complicated with DM in PHC Centers at MoH:

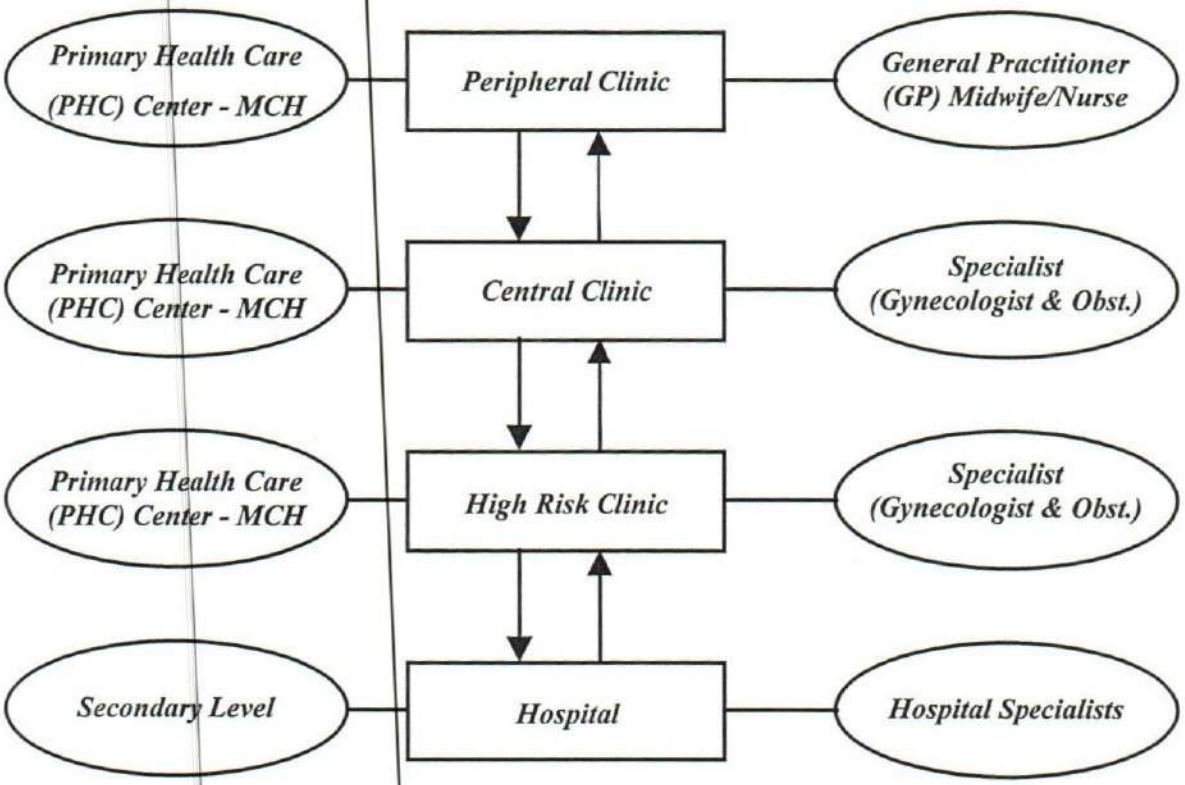


Table ***Different PHC centers throughout the Southern area and their respective flow chart of the referral system in case of pregnancy complicated with DM:MoH services***

Peripheral PHC centers	Central Clinics	High Risk Clinics	Hospital
Shouhada' Bani Suhaila, Abasan saghira, Abasan kabira, Karara, Khuza' a, Khan Younis, Elzana	*Shouhada' Khan Younis Central Clinic*	*Shouhada' Khan Younis High Risk Clinic*	*Khan Younis Hospital*
Tal Sultan, Rafah, El Junena	*Shouhada' Rafah Central Clinic*	*Shouhada' Rafah High Risk Clinic*	

Appendix (III)

الخدمة المقدمة في المنطقة الجنوبية (محافظتي خان يونس ورفح)

في مجالات صحة الأم (الحمل - الحمل الخطر)

بناء على طلب الباحثة في مقابلة أجرتها مع د. علي نوح قاعود مدير دائرة صحة المجتمع أفاد بأن هناك خدمات تقدمها وزارة الصحة (الرعاية الأولية) في مجالات خدمة الأم الحامل - الطفل - تنظيم الأسرة. وتوجد ٦ عيادات مركزية موزعة في محافظات غزة منها عيادة في مركز شهداء خان يونس وعيادة في مركز شهداء رفح وكل عيادة من هذه العيادات تغطى من قبل أخصائي أمراض النساء والولادة طوال أيام الأسبوع.

- تعاين في هذه العيادات الحالات المحولة من العيادات الفرعية الصحية الموزعة على جميع مناطق المحافظتين بينما تعاين حالات الحمل الخطر في كل من مركزي شهداء خان يونس ورفح .
- تحول الحالات من العيادات المركزية إلى قسم النساء والولادة في مستشفى خان يونس وهذه الحالات تشمل جميع حالات الحمل الخطر المذكورة ومنها داء السكري وهي معفاة من رسوم المتابعة والتحاليل ودخول المستشفيات إذا لم يكن لها تأمين ومتابعة في العيادات المركزية أو الفرعية كما تقدم الخدمة نفسها للحالات المحولة من المراكز الصحية الغير حكومية (وكالة ...) .

أما بالنسبة لحالات السكري:

- تعاين حالات الحمل جميعها والتي تحضر للمراكز الصحية من بداية الحمل بواسطة الأخصائي في العيادة المركزية والطبيب العام والقابلة في العيادة الفرعية حتى نهاية الحمل مجانا وتشمل العلاج ودخول المستشفى لحالات الحمل الخطر. ويتم التعاون بين أخصائي الولادة والسكري سواء في العيادات المركزية أو المستشفيات. ويتم عمل جميع الفحوصات اللازمة لجميع الحالات طوال فترة الحمل مجانا بينما يتم فحص سكر صائم لجميع حالات الحمل العادية في الأسبوع ٢٨.
- أي مشكلة تحتاج بعد الولادة لعلاج أو دخول مستشفى تقدم مجانا لحالات داء السكري مع الحمل.
- تستقبل العيادات المركزية بعض حالات الحمل الخطر من عيادات الوكالة ومن ضمنها حالات السكري ويتم التعامل معها تماما كما في الحالات المحولة من مراكز صحة الأم التابعة لدائرة صحة المجتمع- الرعاية الأولية . ومثل ذلك تعامل الحالات المحولة من المؤسسات الصحية الغير حكومية.

د. علي نوح قاعود
مدير دائرة صحة المجتمع

ALESTINIAN NATIONAL AUTHORITY
INISTRY OF HEALTH - PRIMARY HEALTH CARE

Appendix (IV)

السلطة الوطنية الفلسطينية
وزارة الصحة - الرعاية الاولية

PREGNANCY CARE RECORD سجل رعاية الحامل

التعريف الشخصي

AME الاسم
AMILY اسم العائلة PERSONAL الاسم الشخصي
USBAND NAME
اسم الز FAMILY اسم العائلة PERSONAL الاسم الشخصي
ATE OF BIRTH AGE
تاريخ الم DAY اليوم MONTH الشهر YEAR السنة العمر
RSONAL I D NO. رقم الهوية الشخصية
DDRESS
العنو
TY المدينة VILLAGE القرية DISTRICT المنطقة

MCH / VILLAGE CENTRE
مركز رعاية / مركز امومة
DISTRICT
المنطقة
DATE OF FIRST
تاريخ الزيارة الاولى
FAMILY FILE NO
رقم ملف العائلة

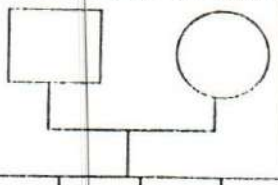
I. SOCIAL / PERSONAL FACTORS	العوامل الاجتماعية الشخصية	RISK FACTORS علامات الخطر
AGE AT MARRIAGE	١) السن عند الزواج	NOTES ملاحظات
RELIGION (MUSLIM 1 CHRSTIN 2 OTHER 3)	٢) الديانة : مسلم ١ مسيحي٢ غير ذلك ٣ 1 2 3	
YEARS OF EDUCATION	٣) عدد سنوات التعليم	
CONSANGUINITY (CLOSE RELATIVE =1 RELATIVE NOT CLOSE = 2 UNRELATED =3)	٤) القرابة بين الزوجين قوية ١ غير قوية ٢ غير اقارب٣ 1 2 3	
NUMBER OF LIVING CHILDREN	٥) عدد الابناء الاحياء	
NUMBER OF CHILDREN WHO DIED	٦) عدد الابناء المتوفين	
HUSBAND'S OCCUPATION	٧) مهنة الزوج	
NUMBER OF PERSONS LIVING IN HOME	٨) عدد الافراد داخل المنزل نعم ا لا ٢	
NUMBER OF ROOMS IN HOME	٩) عدد الغرف داخل المنزل	
) WORKS OUTSIDE OF HOME (YES = 1 NO =2)	١٠) العمل خارج المنزل 1 2	
) ELECTRICITY IN HOME (YES = 1 NO = 2	١١) كهرباء بالمنزل نعم ١ لا ٢ 1 2	LOW RISK خطر خفيف
) RUNNING WATER IN HOME (YES = 1 NO =2)	١٢) مياه جارية داخل المنزل نعم ١ لا٢ 1 2	MEDIUM RISK خطر متوسط
) TOILET (INDOOR = 1 OUTDOOR = 2 NONE = 3)	١٣) مرحاض داخلي ١ خارجي ٢ لايوجد ٣ 1 2	HIGH RISK خطر كبير
) SMOKING = 1 ALCOHOL = 2 DRUGUSE = 3	١٤) التدخين ١ شرب الخمور ٢ شرب المخدرات ٣ 1 2 3	

II. MEDICAL FACTORS	العوامل الطبية	RISK FACTORS علامات الخطر
OPERATION (YES 1 NO 2) SPECIFY:	١) عمليات جراحية نعم ١ لا ٢ حدد : 1 2	NOTES ملاحظات
MEDICAL CONDITIONS (DIABETES = 1 HEART DISEASE = 2 HIGH BLOOD PRESSURE = 3 KIDNEY = 4 BLOOD DISORDER = 5 ENDOCRINAL DISEASE = 6 OTHER SPCIFY = 7	٢) الحالة الصحية (سكري ١ امراض قلب ٢ ضغط دم٣ امراض الكلي ٤ امراض دم ٥ امراض الغدد الصماء ٦ غير ذلك مع التحديد ٧ 1 2 3 4 5 6 7	
IMMUNIZATION	٣) التطعيمات :	LOW RISK خطر خفيف
RUBELLA (YES = 1 NO =)	ضد الحصبة الالمانية نعم ١ لا ٢ 1 2	MEDIUM RISK خطر متوسط
TETANUS (YES = 1 NO = 2)	ضد الكزاز نعم ١ لا ٢ 1 2	HIGH RISK خطر كبير

III. HISTORY OF PREGNANICIES	تاريخ الحمولات السابقة	RISK FACTORS علامات الخطر
TOTAL NUMBER OF PREGNANCIES	١) المجموع الكلي للحمولات	NOTES ملاحظات
SPONTANEOUS ABORTION	٢) الاجهاضات التلقائية	
ELECTIVE ABORTION	٣) الاجهاضات الاختيارية	
CAESARIANS	٤) عمليات قيصرية	
STILL BIRTHS	٥) ولادات ميتة	
LIVE BIRTHS	٦) ولادات احياء	
INFANT DEATHS	٧) وفيات رضع	
DATE COMPLETION OF PREGNANCY	٨) تاريخ انهاء الحمل الاخير	
PLACE OF LAST DELIVERY (HOME 1 HOSPETAL 2 OTHER 3)	٩) مكان الولادة السابقة بيت ١ مستشفى ٢ غير ذلك ٣ 1 2 3	
) BIRTH WEIEGHT OF NEW BORN IN GRAMS (UNKNOWN = 0)	١٠) وزن الطفل الاخير حين الولادة بالغم غير معروف صفر (٠)	
) DURATION OF BREAST FEEDING OF LAST INFANT (MONTHES)	١١) مدة الارضاع الطبيعي للطفل الاخير بالاشهر	
) CONTRACEPTION (NONE = 0 BREAST FEEDING = 1 IUD = 2 PILLS = 3 OTHER = 4	١٢) استعمال موانع الحمل لاشئ (٠) رضاعة ١ لولب ٢ حبوب ٣ غير ذلك ٤ 0 1 2 3 4	
) TOXEMIA YES 1 NO 2	١٣) تسمم الحمل نعم ١ لا ٢	
) PREVIOUS HEMORRHAGE YES = 1 NO 2	١٤) نزف سابق نعم ١ لا ٢ 1 2	
) POST PARTUM HEMORRHAGE YES = 1 NO =2	١٥) نزف بعد الولادة ١ نعم ٢ 1 2	LOW RISK خطر خفيف
) COMPLICATIONS OF PREGNANCY	١٦) مضاعفات الحمل 1 2	MEDIUM RISK خطر متوسط
) COMPLICATIONS OF DELIVERY	١٧) مضاعفات الولادة	HIGH RISK خطر كبير

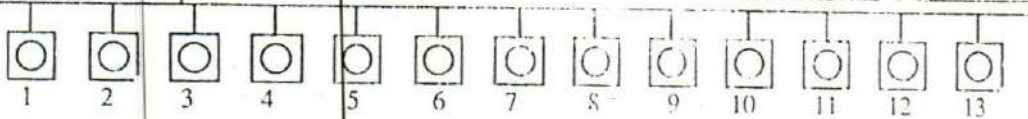
شجرة العائلة الصحية

FAMILY TREE - HELATH STATUS



دليل

TWINS =		توام
ABORTION =		اجهاض
STILL BIRTH		مولود ميت
INFANT DEATH =		وفاة رضيع
LIVE MALE =		ذكر حي
LIVE FEMALE =		أنثى حية



SEX الجنس													
	1	2	3	4	5	6	7	8	9	10	11	12	13

ame ..... الاسم

ear / Birth ..... سنة الولادة

ealth Status ..... الحالة الصحية

otes ..... ملاحظات

IV. PRESENT PREGNANCY

الحمل الحاضر

LMP ١) تاريخ الحيض الاخير

FIRST FETAL MOVEMENT ٢) اول حركة للجنين

EDC ٣) التاريخ المتوقع للولادة

BREAST FEED AT CONCEPTION ٤) حمل اثناء الارضاع

(YES = 1. NO = 2) نعم ١ لا ٢

MONTH (OF PREGNACY) OF FIRST XAMINTION ٥) عدد اشهر الحمل عند اول فحص

MEDICATIONS (YES = 1. NO = 2) ٦) استعمال الدواء نعم ١ لا ٢ 1 2

ACUTE ILLNESSES : ٧) امراض حادة

RISK FACTORS علامات الخطر

NOTES ملاحظات

LOW RISK		خطر خفيف
MEDIUM RISK		خطر متوسط
HIGH RISK		خطر كبير

Preliminary Assessment of Pregnancy Risk Factors
التقييم الاولي لعوامل الخطر عند المرأة الحامل

		A	B	C
Social / Personal Factors	عوامل اجتماعية . شخصية			
Medical Factors	عوامل طبية			
History of previous Pregnancies	تاريخ الحملات السابق			
Present Pregnancy	الحمل الحاضر			
Total	المجموع			

SUMMARY OF RISK FACTOR ASSESSMENT
ملخص لتقييم علامات الخطر

REFERRAL TO HIGH RISK CLINIC
تحويل الى عيادة الحمل الخطر

Date التاريخ

Signature التوقيع

تحويل وتقرير عيادة الحمل الخطر

REFERRAL AND REPORT OF HIGH RISK CLINIC

TE OF REFERRAL تاريخ التحويل ..... H. R. CLINIC عيادة الحمل الخطر

TE EXAMINED IN H. R. CLINIC تاريخ الفحص في عيادة الحمل الخطر

COMMENDATIONS OF H. R. CLINIC توصيات عيادة الحمل الخطر

LAB TESTS — فحوصات مخبرية

TEST الفحص	Date التاريخ	RESULT النتيجة
REGNANCY TEST فحص الحمل		
EMOGLOBINS فحص الهيموجلوب		
LOOD TYPE فصيلة الدم		
H عامل ار ارتش		
OOMBS كومبس		
ORL مختبر		
LOOD SUGAR السكري في الدم		
RINE البول		
HALASSEMIA الثلاسيميا		

HUSBAND AS INDICATED الزوج حسب الحاجة

BLOOD TYPE ..... فصيلة الدم

RH ..... عامل ار اتش

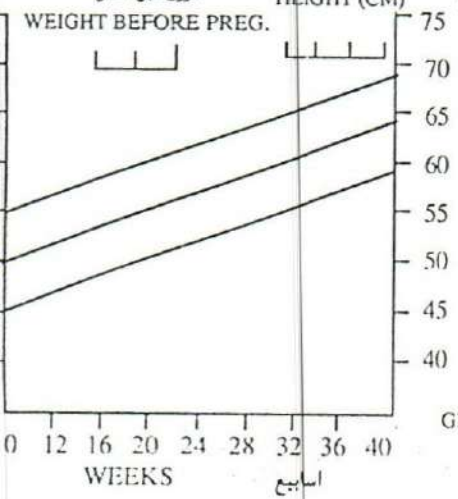
THALASSEMIA ..... الثلاسيميا

NOTES : ..... ملاحظات

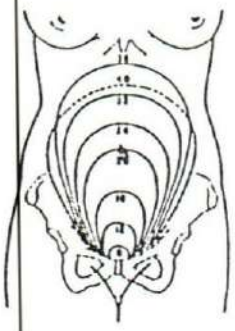
الزيادة في وزن المرأة الحامل
MATERNAL WEIGHT GAIN

الوزن قبل الحمل
WEIGHT BEFORE PREG.

الطول سم
HEIGHT (CM)



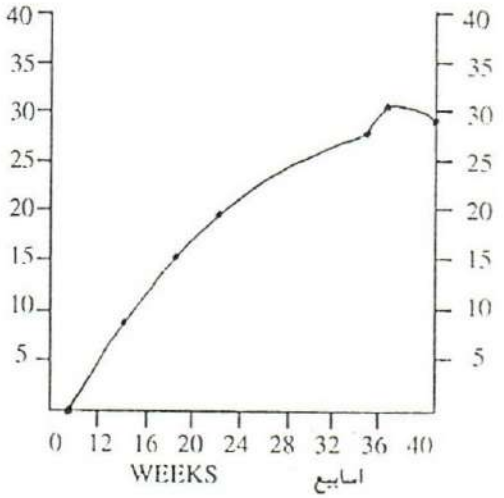
متابعة الحمل الحاضر
PRESENT PREGNANCY FOLLOW UP



FUNDAL HT. IN CMS (LINEAR DISTANCE ABOVE)
ارتفاع الرحم بالسانتي الافقية فوق سطحة العانه

GROWTH OF FUNDUS & WEEKS OF GESTATION
نمو قعر الحمل وعدد اسابيع الحمل

ارتفاع قعر الرحم
HEIGHT OF FUNDUS



NURES'S EXAMINATIONS

رقم الزيارة of sit	تاريخ الزيارة Date of Visit	اسابيع الحمل Weeks Preg.	الوزن WEIGHT	الضغط Blood Press.	النبض Pulse	ارتفاع قاع الرحم Fundus (cms)	وضع الجنين Pres / Position	نبض قلب الجنين FHS	حركة الجنين Fetal H. Move.	الوذمه EDEMA	البول URINE SUGAR PROTEIN سكر بروتين	غير ذلك OTHER	توقيع الممرضة NURSE'S SIGNATURE
2													
4													
5													
7													
8													
0													
1													
2													
3													
4													

NURSES NOTES	ملاحظات المرضة	NURSES NOTES	ملاحظات المرضة

MEDICAL EXAMINATIONS الفحوصات الطبية

No. of Exam رقم الفحص	Date التاريخ	Weeks Preg. اسابيع الحمل	General Condition الحالة العامة	BREASTS الثديين	PELVIC الحوض	Position Presention وضع الجنين	Funds (cms) ارتفاع الرحم	FHS نبض قلب الجنين	TREATMENT / COMMENTS العلاج / ملاحظات	DOCTOR الطبيب
1										
2										
3										
4										
5										
6										
7										
8										

Hospitalization & high risk care الايواء في المستشفى والعناية الخاصة

الرقم No	التاريخ Date	HOSPITAL المستشفى	NOTES ملاحظات	DR الطبيب

SPECIAL TESTS فحوصات خاصة

Test الفحص	Date التاريخ	RESULTS النتائج

DOCTOR NOTES ملاحظات الطبيب

DOCTOR NOTES ملاحظات الطبيب

V.I . COMPLETION OF PREGNANCY

انتهاء الحمل

RISK FACTORS عوامل الخطر

1) PLACE OF DELIVERY
(HOME = 1 HOSPITAL = 2 MATERNITY CTR 3
OTHER = 4)

مكان الولادة
١) بيت ١ مستشفى ٢دار توليد ٣ غير ذلك ٤ 1 2 3 4

2) DAYA (YES = 1 NO = 2)

٢) داية نعم ١ لا ٢ 1 2

3) BIRTH (ALIVE = 1 STILL BIRTH = 2 ABORTION = 3

٣) الولادة حي ١ ميت ٢اجهاض ٣ 1 2 3

4) BIRTH WEIGHT (GRAMS)

٤) الوزن عند الولادة بالغرامات

5) APGAR SCORE (5 MIN)

٥) معامل ايجار بعد ٥ دقائق

6) VITAMIN K (GIVEN = 1 NOT GIVEN = 2

٦) فيتامين ك اعطى ١ لم يعطي ٢ 1 2

7) STAY IN HOSPITAL (DAYS)

٧) المكوث في المستشفى (عدد الايام)

8) PKU / HYPOTHYROIDISM
(SCREENED = 1. NOT SCREENED = 2)

٨) ب. ك. ي
نقص هرمون الغدة الدرقية فحص ١ ولم يفحص ٢ 1 2

9) COMPLICATIONS

٩) المضاعفات

10) FEEDING (BREST = 1. OTHER = 2

١٠) التغذية رضاعة ١ غير ذلك ٢ 1 2

11) MOTER'S CONDITION AT DISCHARGE

١١) حالة الام عند الخروج

12) BABY'S CONDITION AT DISCHARGE

١٢) حالة الطفل عند الخروج

NOTES

ملاحظات

NOTES ملاحظات

التعريف الشخصي على الطفل
PERSONAL IDENTFICATION OF BABY

NAME ..... الاسم

DATE OF BIRTH ..... تاريخ الولادة

SEX ..... الجنس

PRRSONAL ID NO ..... رقم الهوية

VII POST PARTUM ASSESSMENT

تقييم بعد الولاة

RISK FACTORS عوامل الخطر

التاريخ
DATE

اسابيع بعد الولادة
WEEKS POST PARTUM

NOTES ملاحظات

) BLEEDING (YES 1. NO 2

١) نزف نعم ١ لا ٢ 1 2

) FUNDUS

٢) قمة الرحم

) BP

٣) ضغط الدم

) BREASTS

٤) الثديين

) WEGHT

٥) الوزن

) BREAST FEEDING (YES = 1. NO = 2

٦) الارضاع بالثدي نعم ١ لا ٢ 1 2

) BABY'S CONDITION

٧) حالة الطفل

) UNDER CARE

٨) تحت الرعاية

) IRON / FOLATE (GIVEN =1. NOT GIVEN = 2)
AFTER BIRTH

٩) استعمال الحديد والفوليت بعد الولادة اعطي ١ لم يعطي ٢ 1 2

0) ANTI - D (GIVEN = 1. NOT GIVIN = 2)

١٠) مضاد د اعطى ١ لم يعطى ٢ 1 2

OTES ..... ملاحظات

SIGNATURE ..... التوقيع

DATE ..... التاريخ

Appendix (V)

UNITED NATIONS

RELIEF AND WORKS AGENCY FOR PALESTINE REFUGEES
IN THE NEAR EAST
UNRWA

وكالة الأمم المتحدة

لإغاثة وتشغيل اللاجئين الفلسطينيين
في الشرق الأدنى
أنروا

بطاقة رعاية الأمومة
MATERNAL HEALTH RECORD

FIELD :	القطر :
HEALTH CENTRE :	المركز الصحي :
R.C. Number :	رقم بطاقة التسجيل :
Serial Number :	الرقم المتسلسل :
Name :	الإسم :
Date of Birth :	تاريخ الولادة :
Level of Education :	مستوى التعليم :
Occupation :	المهنة :
Name of Husband :	إسم الزوج :
Level of Education :	مستوى التعليم :
Occupation :	المهنة :
Address :	العنوان :
How to Contact :	طريقة الإتصال :
Date of First Registration :	تاريخ التسجيل لأول مرة :

ملخص سيرة الحمول السابقة منذ إصدار بطاقة الرعاية (عدد المرات)

SUMMARY OF PAST OBSTETRIC HISTORY AS OF DATE OF ISSUING MATERNAL HEALTH RECORD (FREQUENCY)

الولادات Para	الحمول Gravida	تاريخ ولادة آخر طفل Date of Last Delivery	عدد المواليد الأحياء Total Number of Live Births	ذكر M	أنثى F

ولادات توائم حية Multiple Live Births		ولادات ميتة Still Births	
إجهاضات Abortions		مواليد بأوزان أقل من ٢,٥٠٠ غ Birth Weight Less Than 2,500 gms	
نزف قبل الولادة Ante-Partum Haemorrhages		مواليد بأوزان أكثر من ٤,٠٠٠ غ Birth Weight 4,000 gms or More	
نزف بعد الولادة Post-Partum Haemorrhages		عمليات قيصرية Caesarian Sections	

مكان الولادة Delivered at:	مستشفى Hospital	عيادة خاصة Private Clinic	مركز توليد Maternity Unit	المنزل Home

الإختلاطات
Complications:

SUBSEQUENT OBSTETRIC HISTORY:

سيرة الحمول اللاحقة

تاريخ الولادة Date of Birth	محصول الحمل Outcome	الوزن عند الولادة Birth Weight	فترة الحمل Gestational Age	نوع الولادة Type of Delivery	الإختلاطات Complications	مكان الولادة Place	الشرف على الولادة Attendant	Dead الوفيات	
								التاريخ Date	السبب Cause
Post. nat.									

GENERAL MEDICAL HISTORY

السيرة الطبية العامة

أمراض عائلية Familial Diseases:	
عمليات جراحية هامة Major Surgery:	نقل الدم Blood Transfusions
أمراض هامة Significant Illnesses:	

السيرة الطبية لرعاية الحمل أو تنظيم الأسرة Medical History for (AN / FP)						
التاريخ Date:						
ضغط الدم: الإنبساطي فوق ٩٠ Hypertension: Diastolic above 90						
الداء السكري Diabetes Mellitus						
إلتهاب المسالك البولية المزمن Chronic UTI						
اليرقان Jaundice						
الصرع Epilepsy						
الصداع النصفي (الشقيقة) Migraine						
أمراض أخرى Other						

MEDICAL CARE

الرعاية الطبية

التاريخ Date	الفحص السريري ـ الفحوص المخبرية ـ التشخيص Medical Examination - Laboratory Investigation - Diagnosis	المعالجة / الأدوية Management / Medications	التوقيع Sign

سجل رعاية الحمل
ANTE-NATAL RECORD

الرقم المتسلسل
Serial Number:

الولادات Para	الحمل Gravida

تصنيف الحمل نسبة للخطورة
RISK TAG

الإسم Name		العمر Age	تاريخ التسجيل Date of Registration	من قبل By
تاريخ آخر دورة طمثية LMP	التاريخ المتوقع للولادة EDD	تاريخ آخر تطعيم ضد الكزاز Date of last TT	الخضاب HB	التاريخ Date
			سكر الدم FBS	التاريخ Date
فصيلة دم الأم وعامل الريزوس Blood Group + Rh : Mother			فصيلة دم الزوج وعامل الريزوس Blood Group + Rh : Husband	

الفحص الطبي
Medical Examination :

Obstetric Examination :

الفحص الطبي المتعلق بالحمل

أسابيع Weeks	الوزن Wt	الثديان Breasts	البول Urine زلال Alb	البول Urine سكر Sug	ضغط الدم BP	وذمة Oedema	نزيف Bleeding	إرتفاع الرحم Fundal Height	المجيء Presentation	نبض الجنين Foetal Heart

RISK ASSESSMENT تقويم الحمل نسبة للخطورة

FACTORS RELATED TO PAST HISTORY (FREQUENCY)

العوامل المتعلقة بالحمول السابقة (عدد المرات)

عمر الحامل أقل من ١٨ سنة او أكثر من ٣٩ Maternal Age Less Than 18 years /More Than 39		عمليات قيصرية Previous Caesarian Sections	
٦ولادات أو أكثر Multiparity (6 or more)		سوابق نزف قبل الولادة Previous Ante - Partum Haemorrhages	
٣ إجهاضات متكررة أو أكثر Consecutive Abortions (3 or more)		سوابق نزف بعد الولادة Previous Post - Partum Haemorrhages	
وفيات حول الولادة (مرتان أو أكثر) Peri - Natal Deaths (2 or more)		الداء السكري (النوع) Diabetes Mellitus (type)	
سوابق تسمم حملي Record of Previous Pre - Eclampsia			

FACTORS RELATED TO PRESENT PREGNANCY

العوامل المتعلقة بالحمل الحالي

التاريخ Date										
الأسابيع Weeks										
علامات مرض القلب Signs of Heart Disease										
إرتفاع ضغط الدم الإنبساطي فوق ٩٠ Hypertension : Diastolic above 90										
وذمة الوجه واليدين او وذمة شديدة في الكاحلين Oedema of Face and Hands and /or Severe Ankle Oedema										
نزيف Bleeding										
زلال في البول ++ Proteinuria ++										
خضاب الدم : ٩ غ أو أقل Hb : 9gms or less										
عدم توافق إرتفاع الرحم مع فترة الحمل Questionable Fundal Height for Gestational Age										
سوء توضع الجنين إعتباراً من الأسبوع ٣٦ Malpresentation from 36 weeks										
غياب حركة الجنين بعد ٢٤ أسبوع Absence of Foetal Movements after 24 weeks										
عوامل أخرى (حندي) Other : Specify										

MEDICAL OFFICER'S APPRAISAL ON FIRST VIST

حمل خطر HIGHT RISK ☐ يستدعي الإنتباه ALERT ☐ حمل طبيعي NORMAL ☐ تقييم الطبيب عند الزيارة الأولى

الإستنتاجات / المعالجة
Conclusions /Management

التاريخ Date :
التوقيع Sign :
الموعد Appt :

FOLLOW UP

المتابعة

التاريخ Date	أسابيع Weeks	الوزن Wt	البول Urine		الخضاب Hb	ضغط الدم BP	وذمة Oedema	نزيف Bleeding	إرتفاع الرحم Fundal Height	توضّع الجنين Presentation	نبض الجنين Foetal Heart	التوقيع Sign

التاريخ Date	Comments / Advice الملاحظات / النصائح	موعد الزيارة القادمة Appt	التوقيع Sign

الرعاية بعد الولادة
POST - NATAL CARE

SUMMARY OF PREGNANCY

ملخص سيرة الحمل

حمل خطر High Risk | يستدعي الانتباه Alert | حمل طبيعي Normal

أسابيع الحمل Weeks Pregnant	تاريخ آخر زيارة لعيادة رعاية الحوامل Date of Last visit to AN Clinic	عدد الزيارات لمركز رعاية الحوامل Total Number of Visits to AN Clinic
نوع الولادة Type of Delivery	التاريخ الفعلي للولادة Actual Date of Delivery	التاريخ المتوقع للولادة Expected Date of Delivery

الرعاية بعد الولادة
POST - NATAL CARE

SUMMARY OF PREGNANCY — ملخص سيرة الحمل

حمل خطر High Risk | يستدعي الانتباه Alert | حمل طبيعي Normal

عدد الزيارات لمركز رعاية الحوامل Total Number of Visits to AN Clinic	تاريخ آخر زيارة لعيادة رعاية الحوامل Date of Last visit to AN Clinic	أسابيع الحمل Weeks Pregnant
التاريخ المتوقع للولادة Expected Date of Delivery	التاريخ الفعلي للولادة Actual Date of Delivery	نوع الولادة Type of Delivery

محصول الحمل Outcome of Pregnancy	الوزن عند الولادة Birth Weight	مدة الحمل بالأسابيع Gestational Age	مكان الولادة Place of Delivery
طفل حي LB ... ولادة متعددة MLB ... جنين ميت SB ... وفاة Dead ... تاريخ وسبب الوفاة Date / Cause :	ذكر Male ...	أنثى Female ...	المستشفى Hospital ... عيادة خاصة Private Clinic ... المنزل Home ... مركز التوليد Maternity Unit ...
الإختلاطات Complications			بواسطة By : طبيب Doctor ... قابلة Midwife ... دايه Dayah ...

MOTHER — الأم

	المنزل Home / المركز HC	المنزل Home / المركز HC
عدد الأيام بعد الولادة Number of Days Post - Partum		
ضغط الدم BP		
الحرارة Temperature		
تاريخ ونتيجة آخر فحص دم Date / Result of Last Hb Test		
إرتفاع الرحم Fundus		
السائل النفاسي Lochia		
شق اللحاف الجراحي أو التمزق Episiotomy/Tear		
الإستجابة لمشورة تنظيم الحمل Reaction to FP Counselling الوسيلة المختارة Method Selected		
موعد الزيارة لعيادة تنظيم الأسرة FP Appointment		

المشاكل / النصائح Problems / Advice	التوقيع Sign : التاريخ Date :

INFANT (S) — الوليد

	العمر Age :	العمر Age :	العمر Age :	العمر Age :
رقم ملف الطفل Child Health Record No				
مكان فحص الطفل (المركز/البيت) Place Seen : (HC/ Home)	المركز HC / المنزل Home	المركز HC / المنزل Home	المركز HC / المنزل Home	المركز HC / المنزل Home
الحبل السري Cord				
التغذية Feeding				
تاريخ تطعيم شلل الأطفال/لقاح السل Date of OPV/BCG				
الفحص السريري Medical Examination				

المشاكل / النصائح Problems / Advice	التوقيع Sign : التاريخ Date :

سجل الولادة وما بعد الولادة
DELIVERY AND POST - NATAL RECORD.

DELIVERY ROOM : Mother's Record سجـــل الام

هل استخدم جهاز تخفيف الالم Was TENS Used :		وجهة نظر الام Opinion .	
بداية المرحلة الاولى 1st. Stage Began	الوقت Time:	التاريخ Date:	
بداية المرحلة الثانية 2nd. Stage Began	الوقت Time:	التاريخ Date:	
بداية المرحلة الثالثة 3rd. Stage Began	الوقت Time:		
ولادة المشيمة Placenta Delivered	الوقت Time:		
المشيمة Placenta	كاملة Complete	غير كاملة Incomplete	
الغشاء Memberanes	كاملة Complete	غير كاملة Incomplete	
العجان Perineum: سليم Intact:	ممزق Tear:	شق العجان Episiotomy:	
كمية الدم المفقودة Total Blood loss :	الترميم Sutured :	قاع الرحم Fundus :	
اي شيء غير طبيعي Any Abnormalities الاجراءات المتخذة Action Taken :			

الحرارة بعد الولادة Post Del. Temp.	النبض Pulse :	ضغط الدم BP:	قاع الرحم Fundus :	النفاس Lochia :
بعد ٣٠ دقيقة 30 Mins.				
بعد ٤٥ دقيقة 45 Mins.				
بعد ٦٠ دقيقة 60 Mins.				

التوقيع والتاريخ Signature / Date	الجرعة / المكان Dose / Route	الادوية المرسلة Drugs Orderd	الادوية المعطاه Drugs given

Post - Natal Ward : Mother حالة الام في القسم بعد الولادة

	النبض Pulse :	ضغط الدم BP:	قاع الرحم Fundus :	النفاس Lochia :
بعد ساعتين 2 Hours				
بعد ٤ ساعات 4 Hours				
بعد ٦ ساعات 6 Hours				
قبل الخروج Before Discharge				
مناقشة تنظيم الاسرة Birth spacing discussed ?				
شرح العناية الطفل والام Care of mother & new born discussed ?				
صالحة للخروج Fit for Discharge ?				
وقت وتاريخ الدخول Time / Date of Admission :				
وقت وتاريخ الخروج Time / Date of Discharge :				

Infant's Record سجـــل الطفـــل

لون السائل الامنيوسي Colour Of Liquor :				
علامة ابجار Apgar Score : دقيقة Min's	صفر 0	٢ 2	٥ 5	
نبض القلب Heart Rate.				
التنفس Respiration				
الانعكاسات Reflex				
الانقباض العضلي Muscle Tone				
اللون Colour				
المجموع Total				
الوزن Weight :	الجنس Sex:	حي Alive:	طفل ميت SB.	
صرخ في Cried at : دقيقة Mins:		الشفط Suction		
الانعاش Resuscitation :				
محيط الرأس HC:		الطول Length:		
وضع الطفل على الثدي Baby put to Breast :				
تبول Passed Urine : تبرز العقي Passed Meconium :				
الفحص / عيوب خلقية Examination / Abnormalities :				
التوقيع Signature				

Post - Natal Ward : Infant حالة الطفل في القسم بعد الولادة

الرضاعة Feeding :	
الحبل السري Cord :	
درجة الحرارة Temp :	
تبول Passed Urine :	
تبرز العقي Passed Meconium :	
هل وضع الطفل ملائم للخروج Is The Baby Fit For Discharge ?	
الملاحظات Comments :	
موعد الطفل لعيادة رعاية الطفل Appt. for baby to attend Clinic :	
موعد الام لعيادة ما بعد الولادة Appt. for mother to attend PN Clinic :	التوقيع Sign.:

PARTOGRAPH منحنى تقدم الولادة

KEEP WITH MATERNAL HEALTH RECORD يحتفظ به مع كرت الام

A/N CARD REVIEWED - YES نعم NO لا

A/N NUMBER رقم كرت الحامل

NAME الاسم _____ R.C NUMBER رقم بطاقة التموين _____ GRAVIDA الحملات _____ PARA الولادات _____

DATE OF ADMISSION تاريخ الدخول _____ TIME OF ADMISSION وقت الدخول _____ RUPTURED MEMBRANES انفجار جيب المياه NO! لا YES: نعم DATE: التاريخ _____ TIME الوقت _____

FETAL HEART RATE ضربات قلب الجنين

180 170 160 150 140 130 120 110 100

LIQUOR السائل الامنيوسي MOULDING تراكب عظام الرأس

(سم) عنق الرحم ضع علامة X (Cm)

10 9 8 7 6 5 4 3 2 1 0

LATENT PHASE المرحلة الكامنة

ACTIVE PHASE المرحلة النشطة

ALERT انذار

ACTION الاجراءات

هبوط الرأس ضع علامة O السامات

Descent of Head Put O Hours

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

الترقيم Time

CONTRACTIONS Per 10 Mins الطلق كل ١٠ دقائق

5 4 3 2 1

DRUGS & IV FLUID GIVEN الادوية والسوائل المعطاة

DRUGS & IV FLUIDS ORDERED الادوية والسوائل الموصوفة

DATE TIME SIGN التاريخ الوقت التوقيع

PULSE AND B.P. النبض وضغط الدم

180 170 160 150 140 130 120 110 100 90 80 70 60

TEMP. °C الحرارة

PROT. ALBUM ACET. VOL. البول

بطاقة خدمات تنظيم الأسرة
FAMILY PLANNING RECORD

الرقم المتسلسل Serial Number:	الإسم Name :	العمر Age :	شرفة على التسجيل Registered By :
تاريخ التسجيل Date Registered :	تاريخ آخر ولادة Date of Last Delivery :	عدد الأطفال الأحياء No. of Living Children :	

PREVIOUS USE OF FP METHODS

سائل تنظيم الأسرة المتبعة سابقاً

الوسيلة المتبعة Method Used	متى When	المدة Duration	المصدر Source	سبب التوقف عن استخدام الوسيلة Reasons for Discontinuation

METHOD SELECTED ON FIRST VISIT

وسيلة المختارة عند الزيارة الأولى

حبوب ثنائية الهرمون
Combined Pills ☐

أحادية الهرمون
Mini Pills ☐

اللولب
IUD ☐

الواقي الذكري
Condoms ☐

التحاميل
Pessaries ☐

وسائل أخرى
Others ☐

GENERAL MEDICAL APPRAISAL

تقويم الطبي العام

تاريخ آخر دورة طمثية Date of LMP	ضغط الدم BP	الوزن Weight	الإرضاع الطبيعي Breast Feeding	قيمة الخضاب Hb Result/Date	فحص الثديين Breast Exam	الفحص المهبلي PV Exam	فحص عنق الرحم Cervical Exam

الإضطرابات الطمثية Menstrual Problems:	مشاكل أخرى: Other Problems:

MEDICAL REVIEW ON: FIRST REGISTRATION: CHANGE OF METHOD: REFERRAL TO SPECIALIST OR HOSPITAL

قصة المرضية عند التسجيل لأول مرة أو عند تغيير وسيلة تنظيم الحمل أو عند إحالة المرأة الى الأخصائي أو المستشفى

التاريخ Date	الشكوى الرئيسة Main Complaint	الوسيلة المعطاة Method Provided	الإرشادات Instructions	التوقيع Sign

CHANGE OR DISCONTINUATION OF METHOD

لتوقف عن استعمال إحدى وسائل تنظيم الحمل أو تغييرها

الوسيلة المتبعة Method Used	مدة الإستعمال Duration of Use	أسباب التغيير أو التوقف Reasons for Change or Discontinuation	الوسيلة الجديدة المتبعة

FOLLOW UP

متابعة

التاريخ Date:	تاريخ أخر دورة طمثية LMP	التقييم العام General Assessment	الملاحظات / النصائح Comments / Advice	الموعد القادم Appt	توقيع Sig

Appendix (VI)

بسم الله الرحمن الرحيم

National Palestinian Authority
M.O.H - PHC
Community Health Admi.
Department of :

السلطة الوطنية الفلسطينية
وزارة الصحة الإدارة العامة للرعاية الأولية
دائرة صحة المجتمع
قسم:

التاريخ: 23/10/99

تعميم

الأخوه العاملين فى عيادات رعاية الحوامل

نرجو العلم بأن الحالات التى يجب تحويلها للعيادات المركزيه لرعاية الحوامل والحمل الخطر كل فى محافظته هى :-

1- Previous C.S , C.Ss
2- Habitual abortions (> 3 abortions)
3- History of intra uterine faetal deaths (IUF D)
4- Rh isoimmunization
5- Primary & Secondary infertility
6- Delivery of congenital malformed baby (babies)
7- History of post partum Haemorrhage
8- Hypertension with pregnancy (P E, ..)
9- Diabetes Mellitus with pregnancy
10- Multiple pregnancy
11- Polyhydramnios or oligo hydramnios
12- Pre-mature Rupture of membrane
13- Blood diseases with pregnancy (Thalassaemia, ...)
14- Anaemia Hb < 8 g.
15- Intrauterine Growth Retardation
16- History of pre –term delivery
17- Ante partum Haemorrhage
18- Intrauterine faetal death or missed abortion
19- Congenital malformed baby
20- Uterine Surgery (Myomectomy , ...) and Medical diseases (Cardiac, Renal ,...)

يبدأ تنفيذ التعميم اعتبارا من تاريخه .

مدير دائرة صحة المجتمع
د. على نوح قاعود

رئيس قسم صحة الأم بالتكليف
د. صدقى شعث

د. صدقي محمد شعث
اخصائي صحة الأم
ترخيص رقم 9/76
Lic. 9/76

صوره للسيد/ مدير عام الرعاية الأولية
صوره للسيد/ مدير دائرة التمريض

Appendix (VII)

بسم الله الرحمن الرحيم

National Palestinian Authority
M.O.H - PHC
Community Health Admi.
Department of :

السلطة الوطنية الفلسطينية
وزارة الصحة الإدارة العامة للرعاية الأولية
دائرة صحة المجتمع
قسم:

تحويل

الى العاملين فى مَراكز الولاده التابعة للرعاية الأولية

نرجو العلم بأن الحالات الممنوع توليدها فى مراكز الولاده ويجب تحويلها لأقسام الولاده فى المستشفيات هى :-

1- Primigravida
2- Multipara ≥ 4 deliveries
3- Previous C.S.
4- History of scar in uterus (Myomectomy) or Cervical tear
5- Intrauterine factal death or history of Intrauterine factal death, or Still birth or early neonatal death .
6- Ante partum Haemorrhage
7- History of post partum Haemorrhage
8- Congenital malformed baby or history of delivery of congenital Malformed baby
9- History of difficult delivery
10- Rh isoimmunization
11- Anaemia Hb<10gm
12- Pre-mature or past date (≥ 42 weeks) (<37 weeks)
13- Premature rupture of membranes
14- Hypertension with pregnancy (P I H)
15- All medical diseases ,Hepatic (D.M , Cardiac, renal, epilepsy, , Blood disease, Auto immune disease ...)

مدير دائرة صحة المجتمع
د. على نوح قاعود

رئيس قسم صحة الأم بالتكليف
د. صدقى شعت

د. صدقي محمد شعت
صحة الأم
ترخيص رقم Lic. 9/16

Appendix (VIII)

DIABETES MELLITUS STATUS AMONG REGISTERD PREGNANT WOMEN IN SOUTHERN OF GAZA PROVINCE, PALESTINE

Serial No. _____ Date / /

Health Center 1= MoH 2 =UNRWA

Group 1= Pregestional DM 2= Gestational DM 3=Control case

Type 1=Delivered 2= Pregnant

Personal information

Wife:

1- Date of birth / /

2- Years of education _____

3- Occupation: 1= Housewife 2= Employee 3= Worker

4- Residence: 1= Khan Younis, 2= Rafah

5- Place of Living: 1 = City 2= Camp 3= Village

6- Age at Marriage _____ years

Husband:

7- Years of education _____

8- Occupation: 1= Unemployed 2= Worker general 3= Employee

9- Age at time of marriage _____ years

10- Consanguineous Marriage 1 = Yes 2 = Non relative

If yes, then is it

1= First cousin marriage 2= Second cousin marriage

Medical History

11- Is there a past history of non communicable disease?

1= Yes 0= No if yes, was it

(1) Diabetes Mellitus (2) Gestational Diabetes Mellitus (3) Hypertension

(4) Heart Disease (5) Respiratory Disease (6) Renal Disease

(7) Others

12- Is there a past history of surgical operation? 1= Yes 0 = No if yes,

Type _____

Number _____

13- Are there hereditary diseases in the family?

1=Yes 2=No 3= Idon't know

if yes, what type of disease? Is it :

(1) Family history of diabetes (2) Family history of hypertension

(3) Family history of renal disease (4) Others

History of Previous pregnancies

14- Gravida (number of previous pregnancy) _____

15- Parity (number of previous alive complete deliveries) _____

16- Number of Abortions _____

17- Number of still births _____

18- Number of alive children _____

19- Number of died children _____ **if present, then**

20- Age of dead child **Cause**

1= one or less than week _____

2=less than 28 days _____

3=29 days to one year _____

4= more than one year _____

21- Is there a history of low birth weight? 1 =Yes 0= No if yes,

Weight of Low Birth weight 1= ≤ 1.5kgm 2= 1.6-2.5 kg

22- Is there history of macrosomia (Birth weight > 4.5 kgm) 1=Yes 0=No

Last pregnancy

23- What is the outcome of the last pregnancy?

(1) Abortion (2) Premature delivery (3) Alive baby

(4) Twins (5) Stillbirth (6) Congenital anomalies

24- Where did you delivered the last baby?

1= Hospital 2= UNRWA MCH

3= Private 4= Home

25- Weight of last alive infants: _____

26- In the last pregnancy, were you advised a place of delivery?

1= Yes 2= No

If yes recommended place 1= Hospital 2= UNRWA MCH

3= Private 4= Home

27- When did you start your first visit to antenatal clinic during last pregnancy? Please specified the follow:

Gestational age at first antenatal visit in weeks _____

Numbers of antenatal visits _____

Pregnant weight in kilogram at first registration _____

28- Did you have any health complications in your last pregnancy?

1 =yes 0= no if Yes, was it

(1) Anemia (2) Bleeding (3) Preeclampsia (4) GDM

(5) Pregnancy induce hypertension (6) IUFD

(7) Heart disease (8) Difficult labour (9) Others

If your answer by (4) then, **what was the treatment for diabetes status during your last pregnancy**

1= Diet 2= Insulin 3= No treatment

29- In your Last pregnancy was there a blood Glucose test done for you?

1 =Yes 2=No if yes,

* Time gestational age by weeks regarding First Blood glucose test _____
* Place 1= UNRWA 2= MoH PHC 3= Private
* First blood glucose value _____
* Type of first blood glucose test 1 = Fasting 2= PPBG 3= OGTT
* Number of blood glucose test _____

30- Did you have any treatment during last pregnancy?

1= YES 2= No treatment if yes,

a) FER+FOL b) Insulin c) Hypertension

d) Antibiotics e) Others : Specify _____

31- Were you examined by a health professional after delivery?

1= Yes 2= No

Current Pregnancy

32- Condition of current pregnancy:

Order and Gestational age of the current pregnancy _____ _____

Gestational age at first antenatal visit by weeks _____

Body weight at first antenatal visit _____

33- Did you have any health problems on current pregnancy?

1= Yes 2= No problems if yes, Type

(1) Arthritis (2) Fatigue & drowsiness (3) Urinary tract infection

(4) Headache (5) Irritable, anxiety (6) Others

34- Do you take treatment during current pregnancy?

1= Yes 2= No If yes, is it :

(1) Tonics (2) Insulin (3) Drugs for Hypertension

(4) Antibiotics (5) Others: Specify _____

35- Are you tested for blood glucose during the current pregnancy?

1 =Yes 2=No if yes,

* Time Gestational age by weeks at First Blood Glucose test _____
* Place 1= UNRWA 2= MoH PHC 3= Private
* First blood glucose value _____
* Type of first blood glucose test 1 =Fasting 2= PPBG 3= OGTT
* Number of blood glucose test _____

36- What are the reported assessment of risk pregnancies in the maternal health record?

_____

_____

Knowledge of women

37- What are the signs of risk pregnancy do you know ?

(1) _____ (2) _____ (3) _____

(4) _____ (5) _____ (6) _____

38- Did you know about DM with pregnancy? 1= YES 2= NO if yes, What type of information do you know?

_____

_____

39- Did you have children suffering from a health disorder?

1=Yes 2=No If yes , then indicate,

TYPE OF disorder	Number
Febrile convulsion	_____
Non febrile convulsion or epilepsy	_____
Congenital anomaly	_____
Mental retardation	_____
Mental handicap e.g. down syndrome	_____
Physical handicap e.g. cerebral palsy	_____

Others, specify _____

Maternal Health

40- Existing antenatal care services

- Satisfaction of existing antenatal care health services:

  1=Satisfied 2= No satisfaction

- Importance of antenatal Care 1= Yes 2= No

if yes, Why ?

---

if No, Why ?

Observation

Weight _____ Kgm . Height _____ m . Blood pressure _____ mmHg

{BMI} _____ weight (kgm) / height (m^2)

Thank you for Your cooperation

Appendix (IX)

داء السكري عند الحوامل المسجلين في المنطقة الجنوبية في قطاع غزة - فلسطين

الرقم المتسلسل : _____ التـــاريخ _____

المركز الصحي : _____

مجموعة الدراسة : أ- داء السكري مع الحمل ب- داء السكري البولي

جـــ- المجموعة الضابطة (السليمات)

وضع المرأة : أ- ولادة ب- حامل

معلومات شخصية

- الزوجة:

١) ما هو تاريخ ميلادك ؟ _____

٢) ما هو عدد السنوات الدراسية التي أكملتها ؟ _____

٣) المهنة : أ- ربة بيت . ب- موظفه . جـــ- عامله .

٤) مكان السكن : أ- خان يونس . ب- رفح .

٥) أين تسكنين ؟ أ- مدينة . ب- مخيم . جـــ- قرية .

٦) كم كان عمرك عند الزواج ؟ _____ سنة

- الزوج :

٧) ما هو عدد السنوات الدراسية التي أكملها زوجك ؟ _____ سنة

٨) ما هي مهنة زوجك ؟

أ- عاطل . ب- عامل غير حرفي . جـ- عامل حرفي .

د- مهني ( ). هـ- تاجر . و- أخرى (حددي _____)

٩) عمر الزوج عند الزواج: _____ سنة

١٠) قرابة بين الزوجين: أ- نعم . ب- لا.

إذا كانت الإجابة بنعم فما هي درجة القرابة بين الزوجين ؟

أ- قرابة درجة أولى (أبناء عم ، عمة ، خال أو خالة) . ب- قرابة درجة ثانية (من العائلة) .

السيرة الطبية

١١) هل تعانين من أي من الأمراض المزمنة التالية :

أ- داء السكري . ب- ضغط الدم المرتفع . جـ- مرض القلب . د- أمراض في الجهاز التنفسي .

هـ- أمراض في الجهاز البولي . و- لا يوجد . ي- غير ذلك (حددي _____)

١٢) هل أجريت لك عمليات جراحية سابقة ؟ أ- نعم . ب- لا .

إذا كان الجواب نعم فحددي النوع والعدد : _____ .

١٣) هل يوجد في عائلتك أي أمراض لها علاقة بالوراثة ؟

أ- نعم . ب- لا . جـ- لا أعرف .

إذا كانت الإجابة بنعم حددي _____

تاريخ الحمولات السابقة

١٤) عدد مرات الحمل السابق : _____

١٥) عدد الولادات الكاملة : _____

١٦) عدد مرات الإجهاض: _____

١٧) عدد الأطفال الذين ولدوا أموات: _____

١٨) عدد الأبناء الأحياء : _____

١٩) عدد الأبناء المتوفين : _____

٢٠) عمر الطفل عند الوفاة: أ- أقل من أسبوع. السبب : _____

ب- أقل من ٢٨ يوم . السبب : _____

جـ- أقل من سنة. السبب : _____

د- أكثر من سنة. السبب : _____

٢١) هل هناك طفل ولد وزنه أقل من ٢,٥ كيلو غرام ؟ أ- نعم . ب- لا .

إذا كانت الإجابة بنعم : أ- أقل من ١,٥ كيلوغرام ب- من ١,٥ – ٢,٥ كيلوغرام .

٢٢) هل هناك طفل ولد وزنه أكثر من ٤,٥ كيلو غرام ؟ أ- نعم . ب- لا .

الحمل السابق

٢٣) ما نهاية الحمل السابق ؟

أ- إجهاض . ب- مخاض مبكر . جـ- طفل حي . د- ولادة متعددة .

هـ- وفاة الجنين في داخل الرحم . و- تشوهات خلقية في الجنين.

٢٤) أين ولدت آخر طفل ؟

أ- بالمستشفى . ب- دار توليد تابعة للوكالة .

جـ- دار توليد خاصة أو عيادة خاصة . د- بالبيت .

٢٥) وزن الطفل الأخير عند الولادة : _____

٢٦) خلال الحمل الأخير هل نصحك الطبيب أو المرضة بالمكان الذي ستلدين فيه طفلك ؟

أ- نعم . ب- لا .

إذا كان الجواب بنعم فهل نصحوك : أ- بالمستشفى . ب- دار توليد تابعة للوكالة .

جـ- دار توليد خاصة أو عيادة خاصة . د- بالبيت (داية) .

٢٧) متى تقومين بأول زيارة إلى مركز رعاية الحوامل أثناء فترة الحمل ؟ اذكري ما يلي

عمر الحمل عند أول زيارة _____

وزن السيدة الحامل عند أول زيارة _____

عدد مرات التردد على مركز رعاية الحوامل _____

٢٨) هل حصل لك أي من هذه المضاعفات خلال آخر حمل ؟

أ- فقر دم . ب- نزيف . جـ- تسمم حمل.

د- داء السكري . هـ- ضغط دم عالي . و- وفاة الجنين .

ي- أمراض بالقلب . ر- مضاعفات أخرى _____ . ز- لم يحصل.

إذا كانت إجابتك بـ (د) فما هو نوع العلاج ؟

أ- حمية غذائية . ب- انسولين. جـ- لاشيء .

٢٩) في الحمل الأخير هل تم فحص السكر لديك ؟

أ- نعم . ب- لا.

إذا كانت الإجابة بنعم :

متى ؟ _____ أين ؟ _____

كيف ؟(نوع الفحص) _____ النتيجة النهائية : _____

عدد مرات الفحص أثناء الحمل الأخير: _____

٣٠) هل تناولت أدوية أثناء الحمل الأخير ؟ أ- نعم . ب- لا .

إذا كان الجواب بنعم فهل هي ؟

أ- مقوي حديد + فولك أسِد . ب- علاج داء السكر ي Insulin .

جـ- علاج ضغط الدم . د- مضادات حيوية .

هـ- أدوية أخرى : حددي _____

٣١) هل تم فحصك من قبل طبيب أو ممرضة خلال الستة أسابيع بعد الولادة ؟

أ- نعم . ب- لا .

الحمل الحالي

٣٢) وضع الحمل الحالي : الرقم: _____ عمر الحمل (بالأسبوع): _____

عمر الحمل عند أول زيارة _____

وزن السيدة الحامل عند أول زيارة _____

عدد مرات التردد على مركز رعاية الحوامل _____

٣٣) هل تعانين من أي متاعب صحية في الحمل الحالي ؟ أ- نعم . ب- لا .

إذا كان الجواب نعم فهل هناك :

أ- آلام في المفاصل . ب- دوخه، إرهاق مستمر. جـ- التهاب في البول .

د- صداع مستمر . هـ- توتر وقلق . و- متاعب صحية أخرى .

٣٤) هل تناولت أدوية أثناء الحمل الحالي ؟ أ- نعم . ب- لا .

إذا كان الجواب بنعم فهل هي ؟

أ- مقوي حديد + فولك أسِد. ب- علاج داء السكري Insulin .

جـ- علاج ضغط الدم . د- مضادات حيوية .

هـ- أدوية أخرى : حددي _____

٣٥) في الحمل الحالي هل تم فحص السكر لديك ؟

أ- نعم . ب- لا.

إذا كانت الإجابة بنعم :

متى ؟ _____ أين ؟ _____

كيف ؟(نوع الفحص) _____ النتيجة النهائية : _____

عدد مرات الفحص أثناء الحمل الأخير: _____

٣٦) ما هي عوامل الخطر المسجلة في ملفات الأمومة ؟

_____

_____

معرفة السيدة

٣٧) ما هي في رأيك صفات علامات الحمل الخطر التي تعرفينها عند السيدة الحامل ؟

أ- ب- جـ-

د- هـ- و-

٣٨) هل سمعت بداء السكري أثناء الحمل ؟

أ- نعم . ب- لا .

إذا كانت الإجابة بنعم :

ما هي معلوماتك عن هذا الداء ؟

_____

٣٩) هل لديك أطفال يعانون من المشاكل الصحية المزمنة ؟

أ- نعم . ب- لا .

إذا كان الجواب بنعم

المشكلة	العدد
- تشنجات حرارية :	_____
- تشنجات غير حرارية أو صرع :	_____

- تشوهات خلقية : _____
- تخلف عقلي : _____
- إعاقة عقلية (الطفل المنغولي) : _____
- داء السكري : _____
- إعاقة جسمانية مثل الشلل الدماغي : _____
- إعاقات أخرى مع التحديد إن أمكن : _____

رعاية الأمومة

٤٠) خدمات رعاية الحوامل :

* القناعة والارتياح من خدمات رعاية الحوامل ؟

أ- راضية . ب- غير راضية.

* أهمية رعاية الحوامل للمرأة الحامل؟

أ- نعم، مهمة . ب- غير مهمة.

إذا كانت إجابتك بنعم فلماذا ؟

_____

_____

إذا كانت إجابتك بغير راضية وغير مهمة فلماذا ؟

_____

_____

الوزن : _____ الطول: _____ الضغط: _____

الوزن / الطول^{٢} _____

شكراً لحسن تعاونكن

د . ألفت عبد الحميد شعت

Appendix (X)

تهدف هذه الدراسة للتعرف على حجم السكر عند الحوامل وحيث من الأهمية الاستمرار في منح صحة عالية للأمهات الحوامل لهن ولأطفالهن وحيث المعرفة والجودة في الأداء تكون بتعاونك معنا كمشاركة في الدراسة وبمشاركتك تطوري في الأداء الصحي من أجل أجيالنا القادمة .

وهذا البحث أجريه لأنه جزء من مشروع دراستي كماجستير في الصحة العامة لجامعة القدس المفتوحة .

الباحثة قد استوفت المتطلبات القانونية والأخلاقية للبحث العلمي ومشاركتك طواعية ولكي الحرية في المشاركة أو عدمها ، كما يمكنك الانسحاب في أي وقت دون إبداء الأسباب ، ولن يكون لذلك أي أثر سلبي على العلاقة مع الباحثة.

من حقك المشاركة بالدرجة التي تريدينها ولكِ الحق في الامتناع عن إجابة أي سؤال في أي وقت وستظل المعلومات المتلقاه في إطار السرية التامة فأنا لا أنشر أي أسماء أو عناوين خاصة في مجال دراستي ، وسيكون رأيكِ الخاص موضع تقدير واحترام وسننشر النتائج من خلال صورة جماعية وليست فردية .

أتمنى مشاركتك الفعالة لكي تساعدي بمعلوماتك الصريحة في تقييم الخدمة المقدمة بشكل صحيح والاستفادة من ذلك في وضع الخطط وتحسين الأداء .

شكراً لكي على المشاركة وإذا رغبت الاستفسار عن أي معلومات إضافية بخصوص هذه الدراسة الرجاء الاتصال بالدكتورة ألفت شعت ، تلفون رقم *2051091* .

فإني أقدر لك قرارك الإيجابي للاشتراك في البحث.

توقيع الباحثة

د. ألفت عبد الحميد شعت

Appendix (XI)

بسم الله الرحمن الرحيم

الأخ الفاضل / الدكتور . عماد طروية

مدير عام وزارة الصحة

الموضوع / أبعاد داء السكرى عند الحوامل المسجلين لدى وزارة الصحة والوكالة فى المنطقة الجنوبية.. بقطاع غزة

أتقدم لسيادتكم للموافقة على أخذ المعلومات اللازمة بخصوص رسالة الماجستير المذكورة أعلاه ، والتي تهدف إلى دراسة أبعاد داء السكري عند الحوامل وتقييم الوضع الصحي للحامل والخدمات المقدمة إليها .. من أجل صحة عالية للأمهات الحوامل ولأطفالهن ، والتي أقوم بعملها من خلال كلية الصحة العامة (وزارة الصحة - جامعة القدس).

وحيث المعرفة والجودة في الأداء تؤدي إلى تطور في الأداء الصحي من أجل أجيالنا القادمة ..

وذلك بإجراء المقابلات والاطلاع على الملفات في كل من الأرشيف بمستشفى ناصر و مستشفى مبارك والرعاية الأولية في مركز شهداء خان يونس ومركز شهداء رفح .

أشكر لكم دعمكم المتواصل .. ودمتم ذخراً للوطن

مقدمه

الدكتورة/ ألفت عبد الحميد شعت

Appendix (XII)

Date: 26 / 4 / 2000

Dear Dr. Ayoub El Alem :

Chief field Health Program-Gaza , UNRWA

Approved.
11/5/2000.

Subject : MAGNATUDE OF DIABETES MELLITUS AMONG REGISTERD PREGNANT WOMEN IN MINISTRY OF HEALTH AND UNRWA PRIMARY HEALTH CENTERS IN SOUTHERN OF GAZA PROVINCE, PALESTINE.

Would you please kindly give me an approval to get access through UNRWA primary health care centers in southern area of Gaza Province to achieve my study goal in process of doing research as requirement of Master MPH study at Al-Quds University, Public Health School.

The aim of the study to measure diabetes mellitus status among registered pregnant women in primary health centers in MOH and UNRWA in Khan Younis and Rafah governerates at Southern of Palestine.

It is important to continue to provide the best care for our pregnant mothers-to-be and their infants. By your support, you well contribute to progress in medical care for our future generation.

Thanks for your cooperation and continuous support

Dr. Olfat Abd El-Hameed Sha'at

Appendix (XIII)

Health Professionals at Depth Responses on knowledge and Practice on Diabetes Mellitus with Pregnancy

Doctors and nurses play a major role in educating their patients if well qualified and trained, emphasizing the importance of dietary intervention, exercise, weight control and compliance with drug therapy.

The aim of this part of the study is to determine the knowledge and practice of health professionals on diabetes with pregnancy and to identify the existing guidelines and training programs. WHO in 1994 developed guidelines of MCH care with PHC, practical guide on the care of mother and baby at the health center level and a publication on the function of hospitals at the first referral level. Regional standards of care for diabetic pregnancies have successful implementation in the Northern diabetic survey based at North Shields, Tyne & Wear region (Hawthorne et al, 1999). The total number of health professionals working in MOH services (1ry & 2ry health care) is an approximately 521 health professionals. While that in UNRWA PHC services is an approximately 54 health professionals.

Methodology

Health professionals working at primary health care centers and secondary health care in the Southern area (MoH and UNRWA) were requested to fill in the questionnaire. This included general practitioners, nurses and midwives and pediatricians, neonatologists, endocrinologists, internists, and obstetricians were the target group. The aim was to detect the sound knowledge on diabetes with pregnancy among relevant health professionals. Data collection using the self-report questionnaire, structured, open-ended questions were designed in English and then translated into Arabic language (Appendix XIII A & B) which permit respondents to replay in their own words, and to avoid the interviews

bias. It was designed to collect data regarding knowledge of health professionals especially on DM in pregnancy anonymously. Twenty minutes were awarded for every questionnaire to be answered. In this study the response rate was 98% only two health professionals refused to participate. Six questions on definition and underlying causes, risk factors increasing the chance to develop GDM, needed investigations, lines of management, written guidelines or received any training on DM with pregnancy, GDM and complications (common fetal complications, common maternal complications and the offsprings complications). The coding took place at the end of the study in order to have all possible answers. The process of the data collection lasted three months May, June and July of 2000.

The level of knowledge and practice of health professionals were tested according to the standard were designed to required according to American Diabetes Association. Six questions test for definition of GDM under lying cause, common risk factor, needed investigations, management, guidelines, training and complication of pregnancy complicated by diabetes. Comparison was made by place of health services (MoH & UNRWA), categories of HP (medical and paramedical), duration of work in two period (< 10 years Or > 10 years). The findings are as follows:

Results

Characteristics of the Sample

The number of respondents was 150 health professionals. They were different health professionals working in the areas giving maternal health services in the

selected PHC centers of MoH, UNRWA and khan Younis hospital as referral hospital. This number included 29 primary general practitioners, 13 internists, 18 obstetricians, 8 pediatricians, 53 senior staff nurses and 29 midwives. The female health professionals were 74 in total. Seventy-two (48.6%) served less than ten years vs. 78 (51.4%) served ten years and more.

Analysis of Answers to the Distributed Questions

Question One

This question was about **definition of gestational diabetes mellitus and underlying causes**: The American Diabetes Association 2000 defines GDM "as any degree of glucose intolerance with onset or first recognition during pregnancy and whether or not the condition persists after pregnancy". The conditions for GDM definition: 1st Appearance is with pregnancy only, 2nd Carbohydrates intolerance and 3rd Disappeared after pregnancy.

Figure 1 & 2 illustrate the answers on definition of GDM, 81 (54.0%) of the health professionals defined GDM as it is mentioned above, 15 (10.0%) they did not report the right answer. Fifty-four (36.0%) define GDM as one condition of the above two conditions in the standard definition. Twenty-two health professionals (14.7%) added disappearance of GDM after delivery as a condition of definition. It was observed that 92.6% of medical health professionals mentioned the first condition of GDM definition comparing to 70.7% of the paramedical health professionals. There was no statistical significance between the health professionals in MoH services and UNRWA (P-value =0.40, Chi-square = 7.38, D.F. = 3)

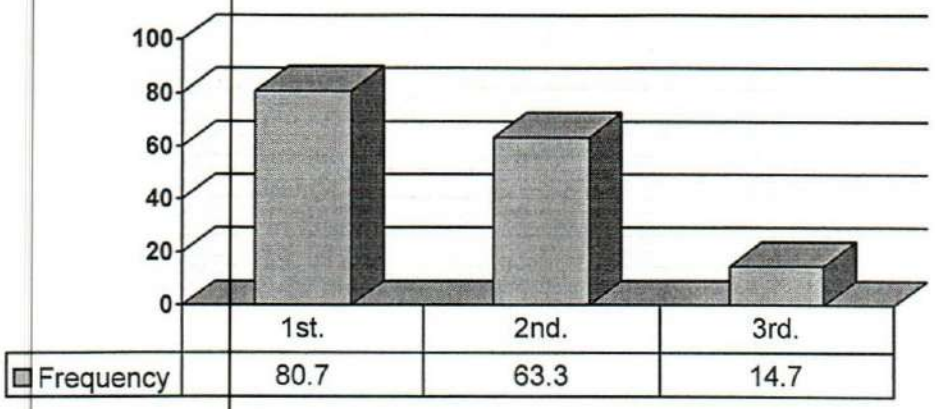


Figure 1 ***Distribution of different conditions mentioned by the health professional regarding definition of GDM***

Underlying causes of GDM: The most common underlying causes of GDM are

1st Insulin resistance due to placental hormones, 2nd Unknown causes, 3rd Pancreatic diseases, 4th Relatively increases demand and stress during pregnancy.

Forty-nine (32.7%) of the health professionals did not report any of the above underlying causes, 69 (46.0%) reported one cause, 26 (17.3%) reported two of the above causes, 6 (4.0%) reported three causes. It was observed that the medical health professionals groups were more close to the right answers than the paramedical professionals, which is going with the expectation. No statistical significant in the two health services (MoH & UNRWA) regarding responses on Q b (P-value = 0.37, Chi-square = 4.27, D.F. = 4), but in general the result is less than the requested standard, are shown Figure 3 & 4.

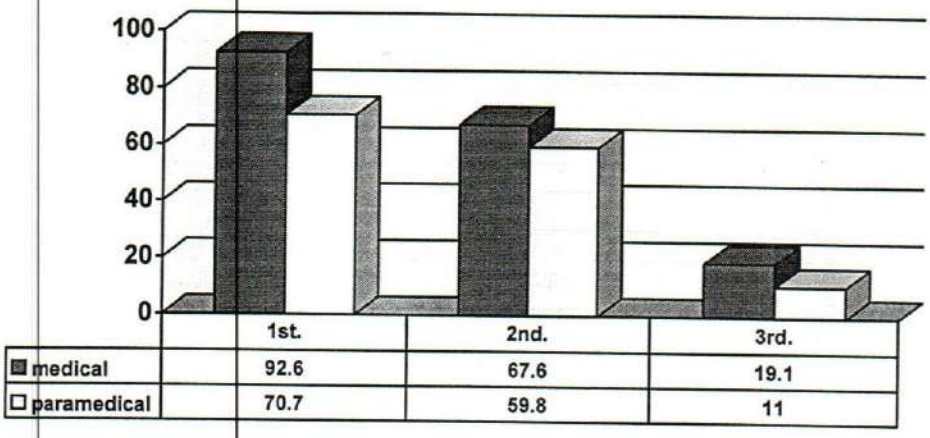


Figure 2 ***Distribution of different definition of GDM and underlying causes mentioned by the medical and paramedical health professional***

No statistical significant differences between the health professionals in reporting the standard definition and underlying causes of GDM among the participants regarding place of work and the duration of involvement in the work. This means that period of work is not significantly important in the level of knowledge, which reflects a need for more training and continues education about DM management and other public health issues related to DM specifically.

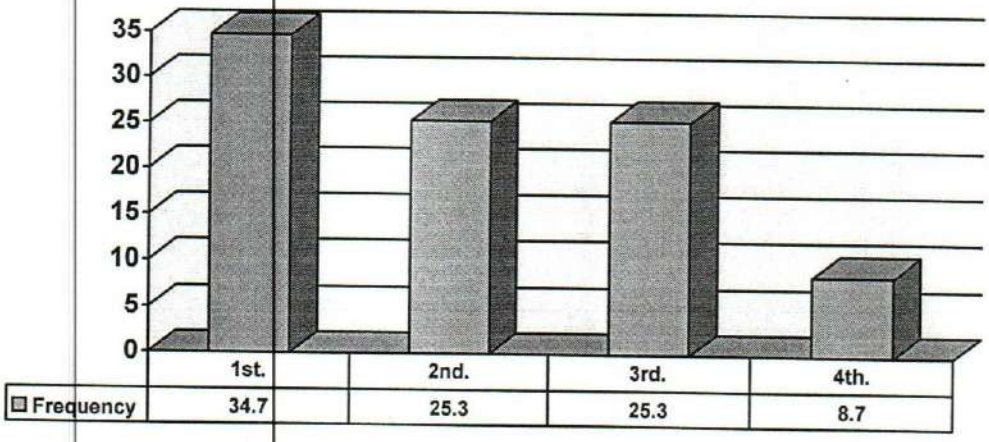
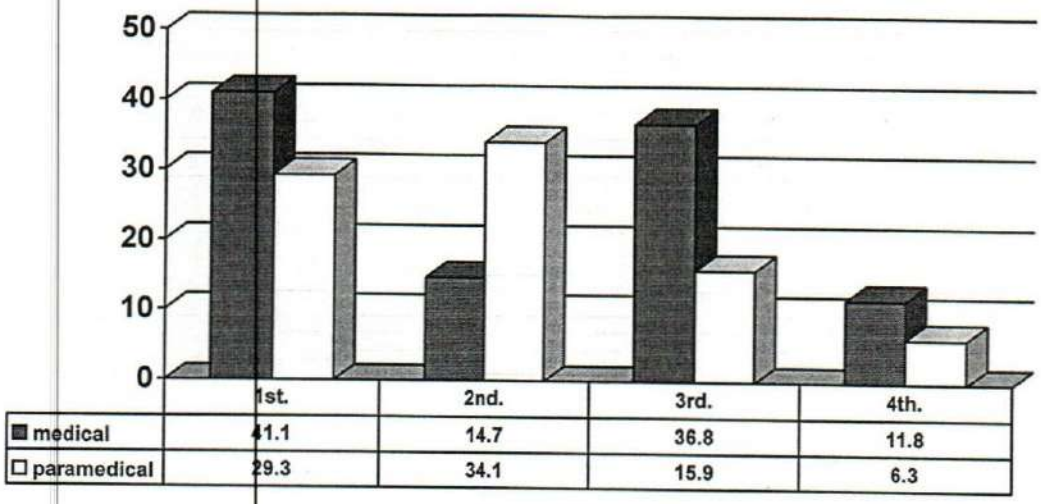


Figure 3 ***Distribution of different points mentioned by the health professional regarding underlying causes of GDM***



	1st.	2nd.	3rd.	4th.
medical	41.1	14.7	36.8	11.8
paramedical	29.3	34.1	15.9	6.3

Figure 4 Distribution of different points mentioned by the health professional participants regarding underlying causes of GDM

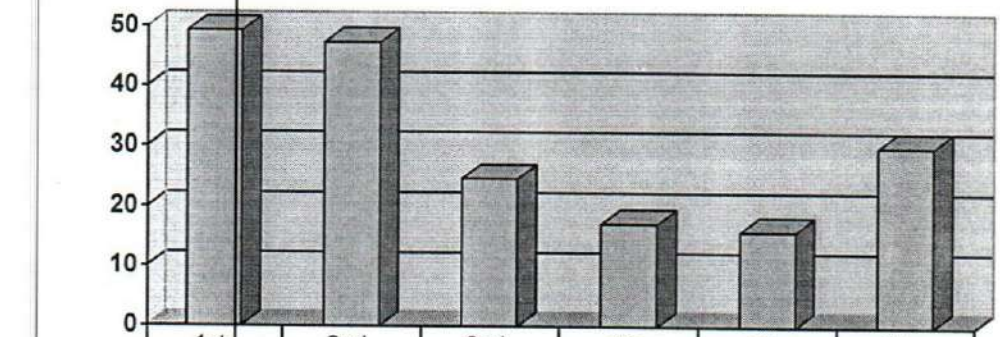
Question Two

a) The common risk factors, which increase a woman's chance of developing GDM:

The following list of risk factors is known to enhance the appearance of GDM. 1st Obesity, BMI more than 27 (more than 80 kg before pregnancy, 2nd Family history of DM, 3rd Increased gravida and parity order, 4th Previous history of GDM, 5th Maternal age older than 30 years on conception, 6th. Other risk factors (pancreatic diseases, stress factors, etc.).

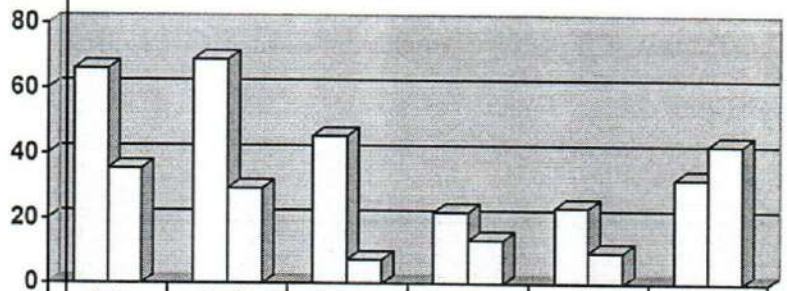
Figure 5, 6 & 7 illustrate the knowledge regarding the known risk factors and undesired outcome of pregnancy, Which are more likely to be associated with GDM. The knowledge was less than the expectation as it showed no differences between the health professionals in reporting the standard definition and underlying causes of GDM among the participants regarding the duration of involvement in the work. This means the period of work is not statistically significant in the level of knowledge, which reflects in need for more training and

continues education about DM management and other public health issues related to DM specifically. In Figure 5 & 6, indicate the needs of in service training and continues education of all health professionals categories (Medical and Para-medical). The difference between the two groups of health professional showed statistical difference. Other risk factors reported by 57 (30.0%) health professionals likely to be associated GDM: Preeclampsa, hypertension induced pregnancy, polyhydraminous, multiple pregnancy, habitual abortion, recurrent attacks of infections.



	1st.	2nd.	3ed.	4th.	5th.	6th.
frequency	49.3	47.3	24.7	17.3	16	30

Figure 5 ***Distribution of reported points on common risk factors associated GDM***

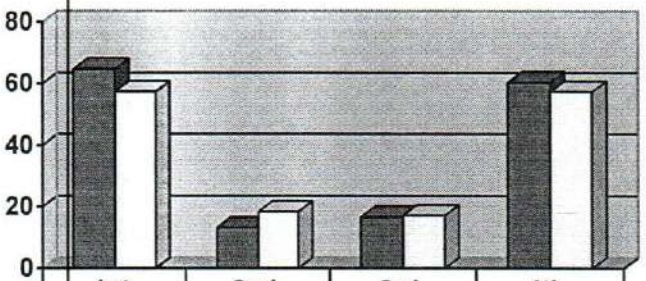


	1st.	2nd.	3ed.	4th.	5th.	6th.
medical	66.2	69.1	45.6	22.1	23.5	32.4
paramedical	35.4	29.3	7.3	13.4	9.8	42.7

Figure 6 ***Distribution of reported points on common risk factors associated GDM***

b) Undesired outcome of pregnancy most commonly associated GDM

1st Macrosomia, 2nd Previous congenital anomaly, 3rd Previous IUFD, 4th Others undesired outcome. It was observed that the macrosomia was mentioned and got the highest frequency of answers. Of the total HP, 64.7% physicians compared to 57.3% paramedical by the two categories of health professionals. There was no difference between the health professionals in reporting the standard definition and underlining causes of GDM among the participants regarding the duration of involvement in the work. This means the period of work is not significantly important in level of knowledge, which reflects the need for more training and continuous education about DM management and other public health issues related to DM specifically like Other undesired outcomes; abortion, LBW, premature, perinatal deaths, neonatal death...etc.



	1st.	2nd.	3rd.	4th.
medical	64.7	13.2	16.7	60.3
paramedical	57.3	18.3	17.1	57.3

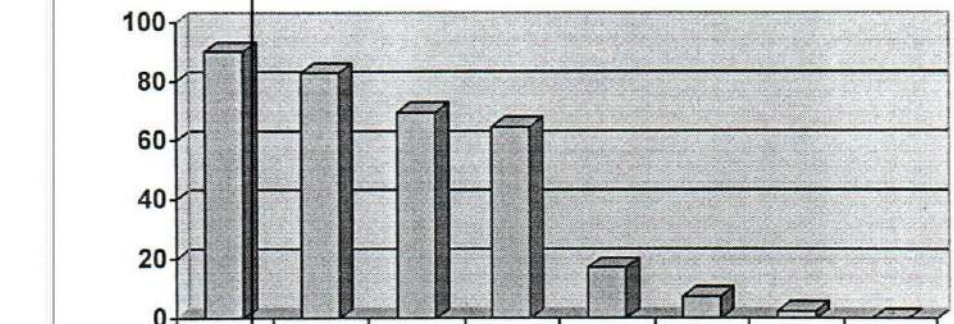
Figure 7 Distribution of reported points on undesired outcome of pregnancy most commonly associated GDM

Question Three

The needed investigations for DM with pregnancy and GDM in specific:

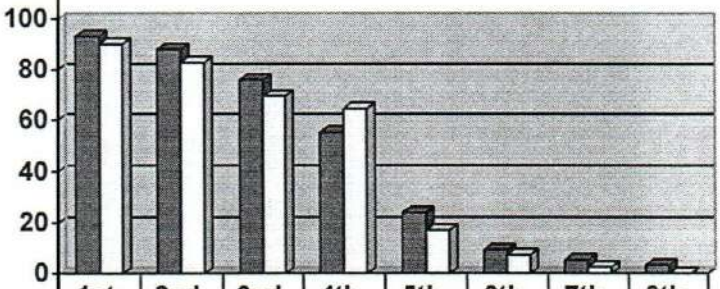
1st Repeated blood glucose estimation, 2nd Screening by FBG at gestational age of 24-28 weeks, 3rd OGTT as diagnostic tool for suspected cases, 4th Urine examination for sugar and Albumin, 5th Blood chemistry investigations, 6th Uterin Ultrasound examination, 7th Screening for complications and 8th Obstetric investigations. The routinely investigations (screening FBS and urine analysis) are requested by the paramedical staff, Nurses and Midwives. Other investigations are blood chemistry, OGTT, medical staff usually requests screening for complications and Ultrasound examination.

Figure 8 & 9 illustrates the study results regarding investigations needed with DM in pregnancy. Blood investigation for glucose level is the most needed investigation reported by the health professionals, which is the worldwide tool for early detection and then early management of DM with pregnancy in general and GDM specifically. Urine examination which is routinely done at each antenatal visit only 55.3% of the health professionals reported it as a needed investigation, in spite of its importance to detect the preeclampsia. Screening for early detection of complications and role of obstetricians reported by 5.3% and 3.3% of medical and paramedical health professionals respectively. Which are less than the standard comprehensive antenatal services especially in community like Gaza population where different risk factors are cumulatively high prevalent, e.g. high fertility rate, short birth interval, high obesity rate and contributing factors. Medical and Paramedical health professionals 9.3%, 7.3% respectively mentioned the need for Ultrasound services for investigation were not reported as much as it was expected.



	1st.	2ed.	3ed.	4th.	5th.	6th.	7th.	8th.
frequency	90.2	82.9	69.5	64.6	17.1	7.3	2.4	0

Figure 8 Distribution of reported answers of health professional about the needed investigations for pregnant to detect DM with pregnancy



	1st.	2ed.	3ed.	4th.	5th.	6th.	7th.	8th.
medical	93.3	88	76	55.3	24	9.3	5.3	3.3
paramedical	90.2	82.9	69.5	64.6	17.1	7.3	2.4	0

Figure 9 Distribution of reported answers of health professional about the needed investigations for pregnant to detect DM with pregnancy

Question four

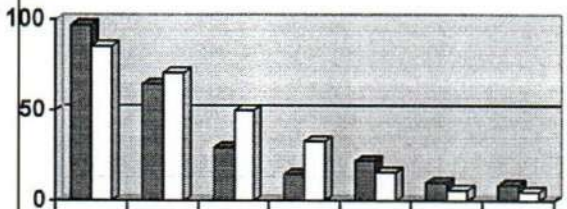
The lines of management of DM with pregnancy and GDM:

1st Insulin., 2nd Diet, 3rd Regular antenatal visits, 4th Education through counseling, 5th Assessment of complications, 6th Team work approach and 7th Hospital management.

Table 1 & Figure 10 describe and illustrate the health knowledge on Question 4, it was observed that 90.7% of the health professionals reported insulin therapy, 97.1% of medical health professionals reported insulin therapy as first line of management. Diet component which is very essential and could be the only line of management reported by 68.0% of the health professionals, 64.7%, 70.7% were reported by medical and paramedical health professionals respectively. Fifty percent of the health professionals did not report appointed regular antenatal visits and counseling (health education) as important component of lines of management. Teamwork approach was reported by only 8% of the health professionals which is consider behind the expectation and the request or recommended comprehensive services. The hospital management was reported by 6.7 % of the total respondents, and it was the lowest frequency line of management reported, (8.8% medical vs. 4.9% paramedical) were reported. On conclusion, it is apparent that the knowledge on the management of DM with pregnancy is deficient and needs improvement.

Table 1 ***Distribution of reported points by the health professional (medical and paramedical) regarding lines of management of DM with pregnancy***

Criteria of Q 4	Frequency		medical		paramedical	
	No.	%	No.	%	No.	%
Insulin	136	90.7	66	97.1	70	85.4
Diet	102	68.0	44	64.7	58	70.7
Regular antenatal visits	61	40.6	20	29.4	41	50.0
Education (counseling)	37	24.7	10	14.7	27	32.9
Assessment complications	28	18.7	15	22.1	13	15.9
Team work approach	12	8.0	7	10.3	5	6.1
Hospital management	10	6.7	6	8.8	4	4.9



	1st.	2nd.	3ed.	4th.	5th.	6th.	7th.
medical	97.1	64.7	29.4	14.7	22.1	10.3	8.8
paramedical	85.4	70.7	50	32.9	15.9	6.1	4.9

Figure 10 Distribution of reported points by the medical and paramedical health professional regarding lines of management of DM with pregnancy

Question five

Availability of written guidelines and pervious training related to DM with pregnancy:

The study results on knowledge of health professionals about question five show that 40 (39.6%) health professionals out of 101-health professionals working in MoH (PHC & hospital) had guidelines on DM with pregnancy while 79.2% on UNRWA services. Ten health professionals in MoH services, which equal to 9.9%, reported having training on DM with pregnancy. While 14 (28.6%) health professionals out of 49 working in UNRWA had such training. Of the total study health professionals 52.7% reported they had guidelines while 16.0% had training. This revealed that the availability of written guidelines and previous training related to DM with pregnancy is inadequate, which leads to lack of harmonization of services between the different health providers (UNRWA & MOH).

Table 2 ***Reported answers regarding availability of written guidelines and previous training on DM with pregnancy by health services***

Place of work	Guidelines		Training		Total
MoH services	40	39.6	10	9.9	101
UNRWA services	39	79.2	14	28.6	49
Total	79	52.7	17	16.0	150

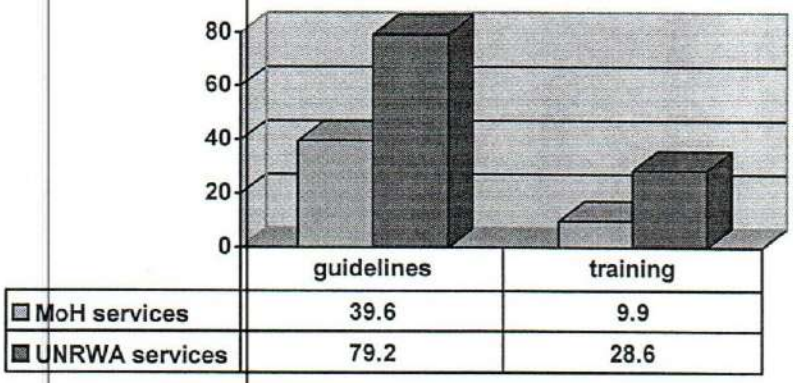


Figure 11 ***Reported answers of health professionals regarding availability of written guidelines and previous training related to DM by health services***

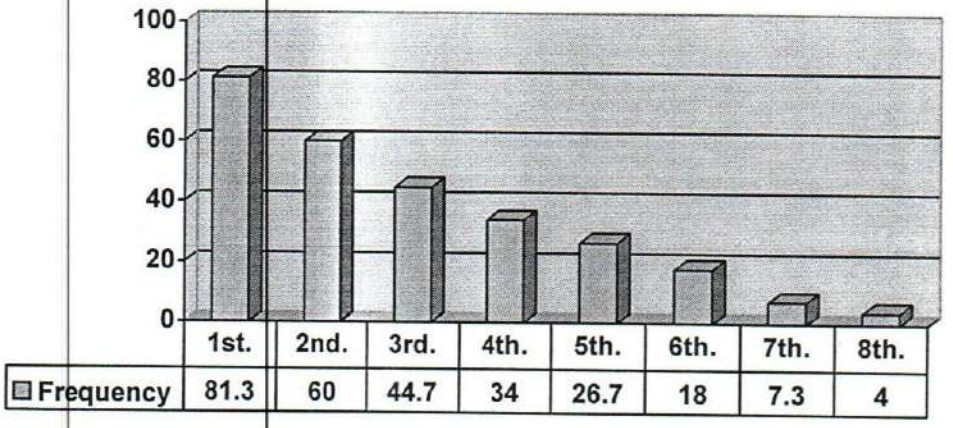
Question six

The common complications of DM with pregnancy:

a) **The fetal complications of DM with pregnancy** 1st Macrosomia, 2nd IUFD, 3rd Congenital anomaly, 4th Abortion, 5th Hypoglycemia of the new born, 6th Prematurity, 7th Respiratory distress syndrome and 8th Low birth weight.

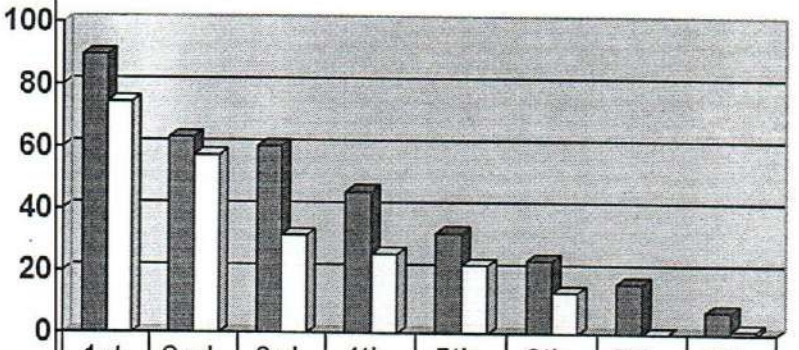
It was observed that the macrosomia was reported by majority of the health professionals (81.3%), while minority of the health professionals (4.0%)

reported low birth weight. Other complications were reported at different percentages and there are significant differences between medical and paramedical health professionals. No statistical significance on answers to Q 6 a between MoH services and UNRWA P- value = 0.390, Chi- =square = 7.38, D. F. = 7 are shown in Figure 12 & 13



	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.
Frequency	81.3	60	44.7	34	26.7	18	7.3	4

Figure 12 ***Distribution of fetal complications associated DM with pregnancy reported by the health professionals***



	1st.	2nd.	3rd.	4th.	5th.	6th.	7th.	8th.
medical	89.8	63.2	60.3	45.6	32.4	23.5	16.2	7.4
paramedical	74.4	57.3	31.7	25.6	22	13.4	0	1.2

Figure 13 ***Distribution of fetal complications associated DM with pregnancy reported by the health professionals***

professionals reported that the offspring of a diabetic mother is at risk later to be diabetic later in life.

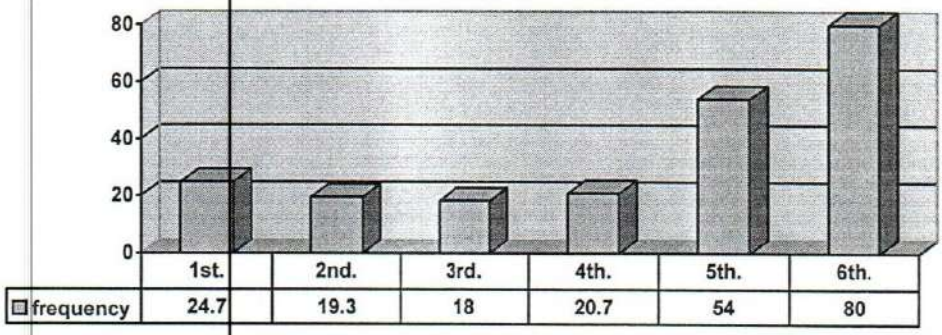


Figure 14 Distribution of reported maternal complications associated DM with pregnancy

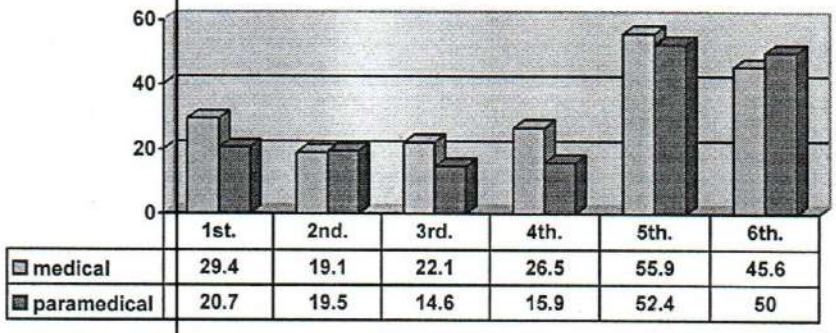


Figure 15 Distribution of reported maternal complications associated DM with pregnancy

Discussion:

All the studied health professionals in MoH and UNRWA show break down in knowledge, skills and practice. They don't show any difference in the knowledge between seniors and gunior staff. They manage diabetics in the same level of quality irrespective to place of work whether in PHC or hospital. Majority showed no statistically significant differences. Having said that, it is

b) Maternal complications associated DM with pregnancy:

1st DM end complications; (retinopathy, Neuropathy, nephropathy and cardiovascular complications), 2nd Persistent DM Type 2 after delivery, 3rd Pregnancy induced hypertension, 4th Polyhydraminous., 5th Obstructed labour and 6th Others.

The study results on the knowledge of health professionals show that 37 (24.7%) of the health professionals reported one or more of the known complications associated with DM in general. Persistent DM after delivery and pregnancy induced hypertension reported by 29 (19.3%), 27 (18.0%) the medical and paramedical health professionals respectively which are less than the expectation. Eighty-one (54.0%) health professionals reported obstructed labour, which is usually expected as complications of DM with pregnancy especially if there is no proper management for the DM with pregnancy. Other maternal complications related to DM with pregnancy namely as difficulty in labour, premature labour, increase the risk of traumatic labour, antipartum and postpartum bleeding and increase the risk to expose to cesarean section were reported by 80 % of the health professionals which are reasonable percentages. There were significant differences between medical and paramedical participants in majority of reported fetal and maternal complications associated with DM. The percentages of medical health professionals who reported fetal and maternal complications associated DM are higher than the percentages of paramedical health professionals, which is going with the expectations, although it was less than the requested level. No statistical significant differences between the two groups of health services on answers Q6 b (P- value = 0.730, Chi-square = 5.25, D. F. = 8). Fourteen (9.5%) of the health

apparent that all the system is in need for refreshment courses, training programs and sound guidelines for management of diabetics. Training courses should include always physicians and nurses from all PHC centers. At a policy level MCH services to be integrated in NCD to achieve better coverage and quality management for diabetic pregnancies. The DM is an emerging problem in Palestine through the epidemiological transition where the risk factors are more common and for women in special as shown in our study, this calls for early detection, intervention and prevention. It agrees with Alwan, 1994. Ultrasound services were not reported as much as it expected for safe pregnancy, especially the fetal growth monitoring and assessment of macrosomia, hydraminios and date of delivery is only conducted by using ultrasonography, particularly in early third trimester (ADA, 2000). Half of the health professionals did not report appointed regular antenatal visits and counseling (health education) as an important component and lines of management. Teamwork approach was reported by minority of the health professionals (8%) which is considered behind the level of expectation and the requested recommended comprehensive services (Hollinsgrowth, 1994 ; ADA, 2000). This indicates lack of knowledge of health professionals, which is reflected on their performance. Of the total of health professionals 52.7% reported to have guidelines while 16.0% had training. Minority (9.5%) of the health professionals reported that the offspring of diabetic mother is at risk later on to be diabetics where the offsprings of women with GDM are at increased risk of obesity, glucose intolerance, and diabetes in late adolescence and young adulthood (ADA, 2000). For safe pregnancy, desired outcome, safe motherhood, good post mortal life, enjoyable and reduction in maternal

morbidities and mortality among woman and infants. Training PHC and hospital staff members, as a team has been unique and a successful experience for continuing education, improvement performance on DM management complicated pregnancy. Strengthened the links between the two levels of care at Southern area will contribute to an overall improvement in the health of Palestinian mothers and children. This highlights the importance of in service training and continuing education of health professionals.

Conclusion and Recommendation

As the participants in this study are representative to health professionals, we can concluded that they are in need to strengthen their knowledge to improve their practices for improvement the performance and quality on DM with pregnancy as follows:

1) The data shows that knowledge and practice of the health professionals working in PHC centers and secondary care centers (hospitals) were be behind the requested level in general.

2) Availability of clear simple technical Guidelines dealing with DM in pregnancy are considered essential tools for improvement of health professionals performance.

3) In service training and continuing education are the core stone for improvement of their performance.

4) Continuos monitoring and evaluation of health professionals practice is essential for correction.

5) Comprehensive health education and individual counseling are simple and height cost effective measures to decrease the risk factors and rate of complication among the pregnant women in general.

6) Teamwork approach is the backbone of an effective plan for reduction of maternal and fetal complications.

7) Finally, translate knowledge into early detection, intervention, prevention and accepted standard occur for exploring variations in the knowledge of diabetic care and developing and testing strategies to close the gap between existing practices and optimal standards of care.

Appendix (XIII-A)

DIABETES MELLITUS STATUS AMONG REGISTERD PREGNANT WOMEN IN PRIMARY HEALTH CARE CENTERS IN SOUTHERN OF GAZA PROVINCE, PALESTINE

Serial No. .....

Health center .....

It is important to continue to provide the best care for our pregnant mothers-to-be and their infants. The knowledge and the quality of care available today have only been made possible with the help and cooperation of health professionals like yourself. By participating you will contribute to progress in medical care for our future generations.

Personal information:

Occupation: , Duration of work :

	MOH	UNRWA
Khan Younis :	( )	( )
Rafah :	( )	( )

Sex :

Please answer the following listed questions:

1) What is the definition of Gestational Diabetes (GD) and what are the underlying causes?

2) What are the common risk factors, which increase a women's' chances of developing Gestational Diabetes Mellitus?

3) What are the needed investigations for Gestational Diabetes Mellitus (GDM)?

4) What are the lines of management of Diabetes Mellitus with pregnancy and Gestational Diabetes?

5) a- Do you have written guidelines (protocol) for identification, follow up and management of diabetes with pregnancy ?

b- Did you receive any training related to your job? If yes, what and when?

6) What are the common complications of Diabetes Mellitus in pregnancy ?

Researcher:

Dr. Olfat Abdel-Hamid Sha'at

Thanks for cooperation

Appendix (XIII-B)

داء السكري عند الحوامل المسجلين في مراكز عيادات الصحة الأولية في المنطقة الجنوبية لقطاع غزة . فلسطين

الرقم المتسلسل : _____ التـــاريخ _____

المركز الصحي : _____

هذه الدراسة تهدف إلى دراسة داء السكري عند الحوامل وتقييم الوضـــع الصحـــي للحـــامل والخدمات المقدمة إليها .. من أجل صحة عالية للأمهات الحوامـــل ولأطفالـــهن . مشـــاركتكم الفاعلة سيكون لها الأثر الإيجابي في نجاح وتطور خدمات الرعاية الصحية والمســـاهمة فـــي إطار التخطيط في أسلوب متكامل للرعاية السكرية .. وذلك من أجل أجيالنا القادمة .

معلومات شخصية :

الوظيفة : _____ **مدة شغل الوظيفة :** _____

مكان العمل :	**حكومة**	**وكالة**
خان يونس	( )	( )
رفح	( )	( )

الجنس :

الرجاء الإجابة على الأسئلة التالية :

١) عرف/ي داء السكري الحملي واذكر/ي الأسباب التي تؤدي إلى حدوثه ؟